

Special Issue of the
"Fruit World"

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JANUARY 1937



The Fruit World Annual

**Price
1/6**

**A BOOK OF DAILY REFERENCE
FOR ORCHARDISTS, FRUIT TRADERS, AND
ALL CONNECTED WITH THE INDUSTRY.**

Published by

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Manurial Insecticide and Fungicide

FOR USE AS A DUST AND A MANURE

Saves Time - Saves Money - Saves Crops

A CONTACT POISON WHICH
POSITIVELY KILLS

Red Spider, Aphid, Codlin Moths, Caterpillars, Grubs,
Fruit Fly, Harlequin Bugs, Pea Mite, Shell Backs, Cut
Worms, and most other pests of Plant and Soil.

A COMBINED INSECTICIDE, FUNGICIDE AND MANURE.

Combines Six Tasks in One

KILLS PESTS - DESTROYS SCALE AND FUNGUS - STERILISES THE
SOIL - REMOVES DISEASE - RESTORES VITALITY -
PROMOTES GROWTH.

HARMLESS TO PERSONS OR PETS - DEADLY TO INSECTS & PESTS

Does not contain Arsenic nor any other poison
which is dangerous to the crops or the user.

For Dusting through "Blowers," ask for
KILL-A-MITE "SUPERFINE."

For Pests and Diseases of Soil, broadcast
KILL-A-MITE "COARSE GRADE" AND
WORK IT INTO THE SOIL.

Stocks available in every Capital City.

Packed in 112 lbs, 56 lbs, 28 lbs Bags.

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A Word of Advice to—

Orchardists, Gardeners and Nurserymen

Entomologists and other Horticultural scientists in all countries now
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Apply these modern scientific methods to your problem.

Get the KILL-A-MITE Habit

For Plants, Trees, Shrubs, Flowers or Vegetables—Dust with "SUPERFINE."
For diseases or pests in the soil—Broadcast "COARSE GRADE."

KILL-A-MITE LEAVES THEM DEAD - - - NOT STUPEFIED.

The Enemy Within Our Gardens

A Proved Remedy for Pests and Diseases

Nothing is more distressing to the real garden lovers than to find that despite all their care and labours the Fruits and tender Plants that they have so carefully nurtured or protected are destroyed or disfigured by pests and diseases seemingly beyond their reach. Every gardener looks expectantly forward to a remedy for these evils, but experience teaches that often the remedy is worse than the disease. Quacks and charlatans thrive on the credulity of the people in all walks of life. That is why the Australian Manufacturers of Kill-A-Mite have refrained from advertising their product in Australia until they were satisfied that it was suitable for Australian conditions and pests. They wanted to prove its claim in Australia before they pushed its sales in this country.

For the past two years they have been testing it in different strengths and degrees of fineness, all with the purpose in view of supplying a preparation which Australian gardeners could safely use to kill their pests and diseases without injuring their Trees and Flowers, and at the same time promote growth. It was a simple matter to arrive at the strength and grade required to sterilise the soil, because the ingredients of Kill-A-Mite are particularly adapted to this purpose in all parts of the world and readily destroy the harmful bacteria with which the soil and also the roots of trees, plants and flowers are so often infected. But to provide a preparation which could be dusted on to the young tender vegetables, delicate fruits, berries and flowers grown under the Australian sunshine was more difficult. The textures of the leaves and blossoms vary so considerably that one might aptly paraphrase an ancient writer by declaring—"one flower's meat is another flower's poison."

Now however they have what the Americans call—"Arrived." They do not claim that Kill-A-Mite will kill all pests, nor cure all diseases, but they do claim that their practical tests in flower gardens, vegetable gardens, nurseries and orchards positively prove that Kill-A-Mite will kill Scale, Fungus, Snails, Slaters, Cut Worms, Aphid, Wood Lice, Harlequin Bugs, Slugs, Red Spider and most of the other pests of both soil and plant to be found in Australia, and what is more, it sterilises the soil and at the same time it contains just enough potash, nitrogen and phosphates to ensure and promote early growth.

This remarkable manurial insecticide is sold in two grades:—One "Superfine" for dusting, through blowers, the plants, vegetables, trees and flowers. The other, a "Coarse" grade which is specially blended and graded for the soil to rid it of grubs, cutworm and other harmful pests, and also of the harmful diseases which so often infect soil that has been bearing crops year after year.

The value of this product to most growers will be readily appreciated when it is pointed out that its cost in most of the capital cities of Australia is less than 2d. per lb. This, for a combined dust and a manure is remarkably cheap.

"FRUIT WORLD ANNUAL"

AND ORCHARDISTS' GUIDE

A Book of Daily Reference for Commercial Fruitgrowers and all interested in the Fruitgrowing Industry.

Published by the FRUIT WORLD PTY. LTD.

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Editor: R. E. BOARDMAN, A.F.I.A., F.A.I.S.

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INSECT PESTS and FUNGOUS DISEASES

Latest Control Methods Described and Illustrated

MANY FACTORS enter into the production of high quality fruit, aspect, soil, stocks, varieties, drainage, cultivation, pruning, irrigation, orchard hygiene, manuring, spraying, etc.

It is with particular reference to the very important matter of spraying that this page, and those which follow, have been compiled.

In the following pages are published colored pictures showing the major fruit pests and diseases, together with the latest control methods from official sources.

For black spot control it would, in the opinion of many capable growers, be of commercial value if trained observers were appointed in specific areas to watch for the development of the spores and for information to be published in the press and broadcast by wireless, giving the exact time to spray. Thus the spraying would be on scientific lines, as opposed to more or less skilful guesswork as to the correct spraying time for maximum efficiency. This should result in less spraying and greater success. Thus the initial outlay would be more than justified.

Thorough Spraying Essential.

Keep the trees healthy by correct orchard practices—cultivation, manuring, pruning, irrigation. Spraying is only one part of the work. Pests severely attack sickly trees.

The seasons are divided thus:—

Spring—September, October, November.

Summer—December, January, February.

Autumn—March, April, May.

Winter—June, July, August.

In Winter.—Spray deciduous trees with red oil, or lime-sulphur, to check San Jose, mussel and olive scales, red spider, bryobia mite, Pear phytotus.

For several fruit rots, spray in mid-winter, after pruning, with Bordeaux, 6-3-40. Spray vines with red oil, 1-20, to kill vine scale.

Late Winter (and before buds open in the spring).—Spray with red oil for scales and mites, and with Bordeaux or lime-sulphur for fungi. Lime-sulphur also destroys red spider and woolly aphis.

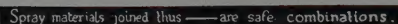
In Spring.—Spray deciduous trees and vines with Bordeaux or Burgundy mixture against black spot, leaf curl and other fungi. Spray with arsenate of lead for codlin moth and leaf-eating insects. Many growers use for the "calyx" spray on Apples and Pears, a combination of arsenate of lead with a fungicide. As a fungicide some growers use lime-sulphur, others Bordeaux or Burgundy. In spring spray Peach, Nectarine, Plum trees, Roses, shrubs and garden plants with nicotine preparations to kill aphides, scales and plant bugs. Spray Apricot trees with Bordeaux 6-4-40 plus 1 lb. lime casein spreader during pink bud stage.

In Summer.—Spray citrus trees with oils or fumigate with hydrocyanic acid gas to kill scales. Continue with arsenate of lead on deciduous trees; white summer spraying oils will kill the codlin eggs, and generally control aphids, red spider and other orchard pests. Continue with nicotine for aphides and scales. Dust with nicotine or pyrethrum insecticides.

the Thrips Investigation League, which has been organised on all-Australian lines, and whose funds have been subscribed by fruit-growers, traders, shipping companies and others of goodwill. The investigation is under the auspices of the Council for Scientific and Industrial Research, the Waite Research Institute, Adelaide, and the Departments of Agriculture in the several States. The entomologist in charge is Dr. J. Davidson, of the Waite Institute, Adelaide. As a result of the research the presence or absence of a thrips plague can be foretold months ahead, and in the event of infestation effective repellent dusts and sprays treatments have been suggested based on laboratory experiments.

See Colored Illustrations on Following Pages.

45.—Strawberry beetle.
16.—Emperor gum moth.
52.—White ants.



With Types of Orchard Pests and Diseases and Materials Suitable for their Control. Reprinted from the Shell Co.'s booklet "Profitable Fruit Culture."

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PREVENT AND CONTROL FRUIT DISEASE.

ORCHARDISTS! Is Your Fruit Clean and of First Grade Quality ?



Spraying to Prevent Disease is Your Only Insurance

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Granulated (Snow) in 56 lb. cartons

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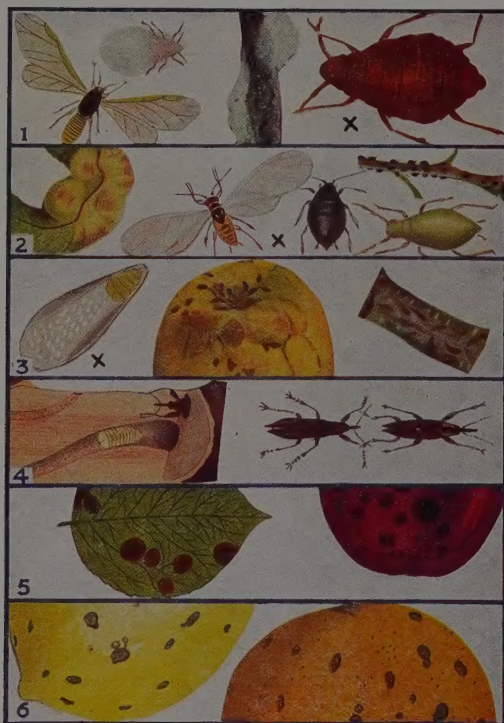
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Obtain our Booklet:—"Better Yields by Spraying with ESA BLUESTONE."
ORCHARDISTS! LOOK FOR THE BRAND! "ESA."

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES.

Pest or Disease. (X magnified.)

Description of Pests as Illustrated.



Woolly Aphis.—This aphis lives in hollows and crevices, on the roots, trunks, and limbs of the Apple tree, causing very unsightly swellings, made by the pricking of their beak-like rostrums (or sucking tubes), thus absorbing the juices of the tree. They are manifested mainly by a white, downy appearance on the twigs, limbs and branches.

Aphis of Peach (Black and Green).—Black and Green Aphis infest branches and leaves, causing the latter to curl and dry up. They are very troublesome when the young shoots are beginning to grow in spring.

Black aphis infest roots.

Various Aphis also attack Roses, Carnations, Pansies, and garden plants.

Apple Mussel Scale.—Attacks the fruit and branches of Apples, Pears, Plums, etc., disfigures the fruit; absorbs sap. If unchecked, will encrust the trunk and main arms.

Apricot Beetles.—Small Weevils with a tapering body, most destructive; they do great damage by boring and tunnelling into Apricot trees.

Black Spot of Apple and Pears.—These fungi attack both fruit and leaves. On the fruit they form dark green, often circular, velvety patches, and generally cause the fruit to crack. On the leaves they appear as round or oval spots.

Black Spot of Orange and Lemon.—The round sunken spots are of a dark brown color, and nestling in the centre are the minute, black, punctiform pustules, visible to the naked eye.

Methods of Control of Insect Pests and Plant Diseases (illustrated above).

(1) **APHIS, WOOLLY** (*Eriosoma lanigera*).—Attacks Apple and Pear trees. **Introduce Apherinus parasite into orchards.** Spray forcibly with nicotine solutions, white oils in summer, and Red Oil in winter. A combination winter spray, Nicotine Sulphate, Red Oil and soap has been found effective. Use pyrethrum dusts. Grow trees having blight-proof stocks.

(2) **APHIS OF PEACH.**—There are two aphids commonly attacking the Peach:—

Green Peach Aphis—*Myzus persicae*.

Black Peach Aphis—*Anuraphis persicae-niger*.

For Green Peach Aphis, use tar distillate 1 in 35 before mid-July; lime sulphur during winter; and white oil and nicotine sprays in the summer. It may be necessary to spray the trees several times in the summer. Keep ground near trees free from weeds.

For Black Peach Aphis, use nicotine sulphate or tobacco sprays in the summer. It may be necessary to spray the trees several times in the summer. Keep ground near trees free from weeds.

For the various aphids attacking Roses, Carnations, garden plants and vegetables, use tobacco sprays or dusts.

(3) **APPLE MUSSEL SCALE** (*Lepidosaphes ulmi*).—Spray in winter with Miscible Red Oils, 1

in 25, or Lime Sulphur, 1 in 15. Spray in summer with White Oils or nicotine solutions.

(4) **APRICOT BEETLES** (*Belus* sp.).—Spray with Arsenate of Lead. Inject Bisulphide of Carbon into tunnels made by beetles.

(5) **BLACK SPOT OF APPLE** (*Venturia inaequalis*).—Spray with Bordeaux Mixture 6-4-40 at the green tip stage, followed by Lime Sulphur 2-80 at petal fall stage, followed by Lime Sulphur 1 in 80 two weeks later.

For Pear Spot (*Venturia pirina*), spray with Bordeaux Mixture, 6-4-40, when the young folded leaves are just protruding from the bud, and again at a slightly later stage, when the young folded leaves and the blossom bud have separated. The blossom buds would still be green.

Some growers follow up with 4-5 ozs. of blue-stone with every 80 gallon vat of lead spray, using also 1 lb. lime casein spreader, or Bordeaux mixture 3-3-50 three weeks after the fruit has formed. The above schedule should not be used for Josephine Pears.

(6) **BLACK SPOT OF ORANGE and LEMON** (*Phoma citricarpa*).—Spray with neutral Bordeaux, 3-3-50, at the first appearance of blossom. If this stage is missed, spray 6-4-100 when fruit is well set. Citrus trees, where the drainage is not efficient, are more prone to this disease than trees on well-drained plantations. Use Sulphate of Iron, $\frac{1}{2}$ lb. to each tree.

Sound Fruit for . . Sound Profit

A USTRALIA is justifiably proud of the fruit it produces, for it is equal to that grown in any part of the world.

Our export market is increasing year by year, and keen growers are using every means to keep their fruit up to export standard.

Climatic conditions in Australia are generally speaking, favorable to the growth of the finest fruits, but, unfortunately, the same conditions favor the spread of insect pests, particularly that terrible enemy of the orchardist, the Codlin Moth. Many an orchardist has realised before the end of the season that he has been robbed of a big proportion of his profits through the ravages of this worst of all pests. There are no statistics available which indicate to Australian orchardists the value of the damage caused through the Codlin Moth — but there is no doubt that the loss each year represents a very large sum.

Before chemical research came to his aid, the orchardist had the worst of the battle, but Arsenate of Lead has proved an effective weapon in combating the pest. Even now, however, the satisfactory control of Codlin Moth is only ensured by continuous work and vigilance, and the orchardist can never afford to let up in his warfare against an enemy that never tires of the attack.

Bickford's "Aero" brand Arsenate of Lead has, for many years, proved the orchardists' surest safeguard against the ravages of Codlin Moth. Leading orchardists all over the Commonwealth are now using this superlative quality Arsenate of Lead with wonderful success, and are unanimous in their verdict that "Aero" brand is the finest Arsenate of Lead on the market.

We unreservedly guarantee, however, that "Aero" brand Arsenate of Lead, in whatever proportion used, will give equal or superior control to that of any other brand used in similar strength.

Keep your Orchard Codlin-free by spraying your Apples and Pears with this Superlative Quality Product.



BICKFORD'S

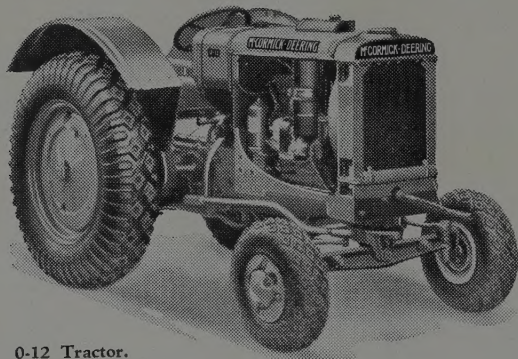
"Aero" Brand

ARSENATE OF LEAD

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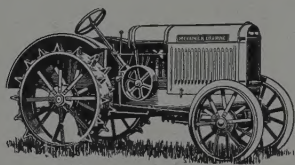
These Tractors and Implements make FRUIT GROWING PAY!

McCORMICK- DEERING 0-12 TRACTOR

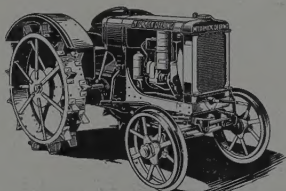


0-12 Tractor.

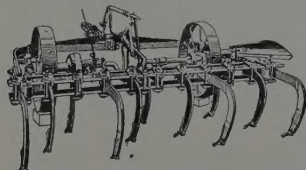
A low, short, compact, narrow tractor, 0-12 is the orchardist's complete mobile power plant. It does the work of four horses, requiring only a fraction of the room demanded by a team . . . works freely between trees and under low branches . . . By means of the power take-off 0-12 operates sprayers and other machines . . . The belt-pulley is handy for a wide variety of jobs . . . 0-12 works on low-cost kerosene fuel



McCormick-Deering 10-20 Tractor. This popular tractor supplies low-cost power for heavy drawbar, belt and power take-off work. Ideal for heavy ploughing and seed bed preparation jobs.



McCormick-Deering W-12 Tractor. Very strong and compact—turns in a 9-ft. radius. This is the standard type 4-wheeled tractor of the McCormick-Deering 12 Series. Operates on approximately a gallon of kerosene per hour.

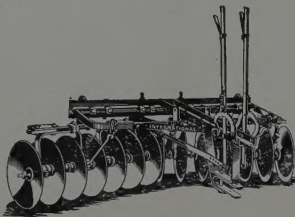


McCormick-Deering No. 1, 6-ft. Tractor Orchard Cultivator. Built close to the ground for orchard work. No levers project upward to strike overhanging branches.

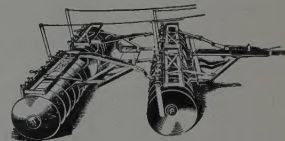
TRACTORS and equipment to cope with every phase of orchard work are represented in the comprehensive lines that International Harvester provides for the use of every orchardist . . . McCormick-Deering tractors with steel wheels or rubber tyres, equally efficient for haulage, or belt-pulley jobs . . . ploughs and harrows for cultivation work . . . implements that will give you long years of full service.

From ploughing to picking time International Harvester stands behind the orchardist, giving him the widest choice of equipment designed to make fruit growing pay the easiest and most efficient way.

Write to us for full information or consult your International Harvester local agents.



This model V tractor disc harrow is equipped with fourteen 18-inch discs made of high quality heat-treated steel.



McCormick-Deering No. 9-A Tractor Disc Harrow.

This harrow is made in 5, 6, 7, 8 and 10-ft. sizes, with 18-inch discs. Built to stand up under the hardest conditions of tractor operation.



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Can be supplied in 5½ and 6-ft. sizes, equipped with 20-inch discs. There is nothing above the discs to injure over-hanging branches.



International E-7 Tractor Orchard Mouldboard Plough.

Built in 2 and 3-furrow sizes and cuts 9-inch furrows . . . Can be worked close to trees, and can be adjusted for shallow ploughing so that it will not injure the roots.

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CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).

Pest or Disease. (X magnified.)

Black Spot of Vine.—The spores are ever-present. Under genial conditions for incubation and growth, the disease spreads rapidly, causing much loss. The disease seldom appears in dry seasons.

Brown Rot.—One of the most serious fungus diseases, the twigs, blossoms and fruit are attacked. (1) Blossom attack looks like frost injury. (2) The infected area on fruit spreads in concentric rings, which consist of millions of summer spores.

Cherry Borer.—The grub of the moth destroys Cherry, Apricot, Peach, Pear and Plum trees by boring into the branches, leaving a sawdust-like appearance on the outside of the hole.

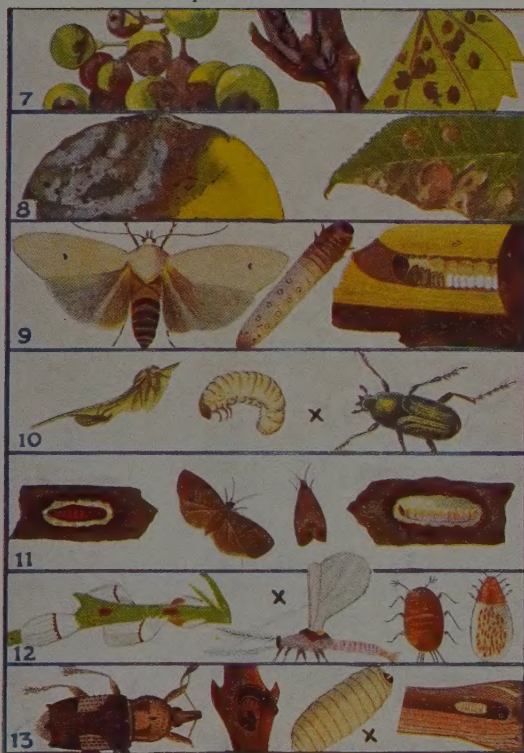
Cherry Green Beetle.—Attacks the leaves of Cherry, Peach, Plum and Apple trees, Roses, and garden plants, etc., and, being in large swarms, will strip a tree in a very short time.

Codling Moth.—The grubs, which hatch in eight or nine days from eggs laid at calyx of young fruit and on leaves, eat into the core; then they eat a tunnel to the outside of the fruit and lower themselves to the ground, and recommence the life-cycle. Several broods appear each season.

Cottony Cushion Scale.—A cushion-shaped scale insect, with a whitish-yellow, cottony down; attacks the leaves and stems.

Curculio of Vine.—A small boring weevil, reddish-brown, with light markings; very destructive. Will remain for twelve months or more in the wood.

Description of Pests as Illustrated.



Methods of Control of Insect Pests and Plant Diseases (illustrated above).

(7) **BLACK SPOT OF THE VINE** [*Anthraco-nose*] (*Manginia ampelina*).—Swab with Acid Iron Solution in early spring before vines show movement. Spray with Bordeaux or Burgundy Mixture (alkaline) when buds are bursting. Follow with Bordeaux or Burgundy neutral, giving applications according to weather conditions.

(8) **BROWN ROT** (*Sclerotinia fructicola*).—Attacks Peach, Plum, and other stone fruit. Destroy mummified fruit. Spray Peaches, Plums, with Bordeaux 6-4-40 at bud movement; follow with Dry Mixed Lime Sulphur, 25 lbs. to 100 gallons, at petal fall, when the fruit is half grown and five weeks before picking; Apricots, Bordeaux, 6-4-40 early pink but and late pink bud.

(9) **CHERRY BORER** (*Maroga unipunctata*).—Clear away the sawdust-like matter, inject Bisulphide of Carbon into tunnel; when using carbon, close mouth of tunnel immediately to keep fumes from escaping. Caterpillars can be destroyed by probing the tunnel.

(10) **CHERRY GREEN BEETLE** (*Diphucephala colapsoides*).—If no fruit on the tree, spray well with Arsenate of Lead when beetle appears. When fruit is ripening, spray with Hellebore powder, 1 oz. in 2 gallons of warm

water. This should be used perfectly fresh, as it is liable to deteriorate with age or exposure.

(11) **CODLING MOTH** (*Cydia pomonella*).—Attacks Apple, Pear, Apricot, Quince, Loquat, Walnut, etc. Spray with Arsenate of Lead, first after petals fall and before calyx cup closes, and at intervals of 21-30 days until within three weeks of gathering fruit. Fungicides may be used with calyx spray. Excellent results have been secured by spraying with White Oils after first Arsenate of Lead spray. Destroy fallen infected fruit. If bandaging trees, examine and destroy larvae, at least every 10 days. Use chemical bandages.

(12) **COTTONY-CUSHION SCALE** (*Icerya purchasi*).—Attacks Orange, Lemon and other citrus trees, shrubs, hedge plants, etc., very severe on *Pittosporum* hedges. Spray with White Oil when the trees are making a decided growth about November. This is the time of the release of the young scale in most districts.

(13) **CURCULIO OF VINE** (*Orthorrhinus Kluggii*).—Inject Bisulphide of Carbon into tunnel and close mouth. Probe with wire. Deterrent.—Spray with Lime-Sulphur in winter.



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Our Lines Include:—

ARSENATE OF LEAD PASTE
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Methods of Control of Insect Pests, as illustrated on opposite page.



(14) **DOWNY MILDEW OF THE VINE** (*Plasmopara viticola*).—Spray with alkaline Copper Soda when vine shoots have grown 8 to 10 leaves. Subsequent sprayings about every seven days if weather conducive to fungus development. The summer treatment for Black Spot and Downy Mildew is identical.

(15) **ELEPHANT BEETLE OF THE ORANGE AND LEMON** (*Orthorrhinus cylindrostris*).—No satisfactory method is known for the control of this pest.

(16) **EMPEROR GUM MOTH** (*Antheraea euclipti*).—Spray when observed with Arsenate of Lead.

(17) **FRUIT FLY** [Mediterranean or West Australian] (*Ceratitis capitata*).—Attacks Peach, Orange, Banana, Quince, Apple, Tomato, Grape, etc. Kerosene in shallow vessels attracts the fly.

Destroy all infected fruit. Destroy weeds, work ground well under trees; poultry and insectivorous birds destroy chrysalids. Use a spraying solution—1 gallon of fruit juice (boil refuse fruit for about one hour), 1 lb. Arsenate of Lead, 25 gallons of water. Spray on windward side of tree.

A Good Lure.—One tablespoonful Scrubbs' ammonia, one teaspoonful essence of vanilla, 1½ pints water. A dessertspoonful of black treacle may be added, but is not essential. "Clensel" and other lures have been used with good results.

(18) **HARLEQUIN FRUIT BUG** (*Dindymus versicolor*).—Spray with Nicotine Solutions, Benzole Emulsion, White Oil or Clensel (1 in 25), whenever observed. Keep orchards free of marsh mallows.

(19) **HOLY OR CROSS BUG** (*Mictis profana*).—When observed, spray with Benzole Emulsion, Nicotine Extracts, or Pine Spray. Shake trees over piece of blanket, and destroy all bugs that fall. Spray with Benzol Emulsion.

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).**Description of Pests as Illustrated.**

Downy Mildew of Vine.—This serious disease over-winters in the dead leaves infected during the preceding summer. Infection in the spring takes place through spores being splashed up by falling rain. These over-wintering spores (or oospores) retain vitality for over 12 months.

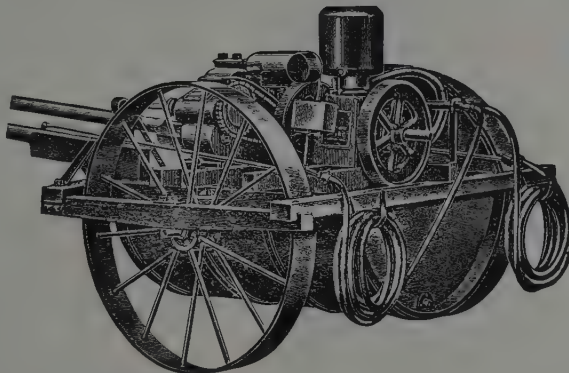
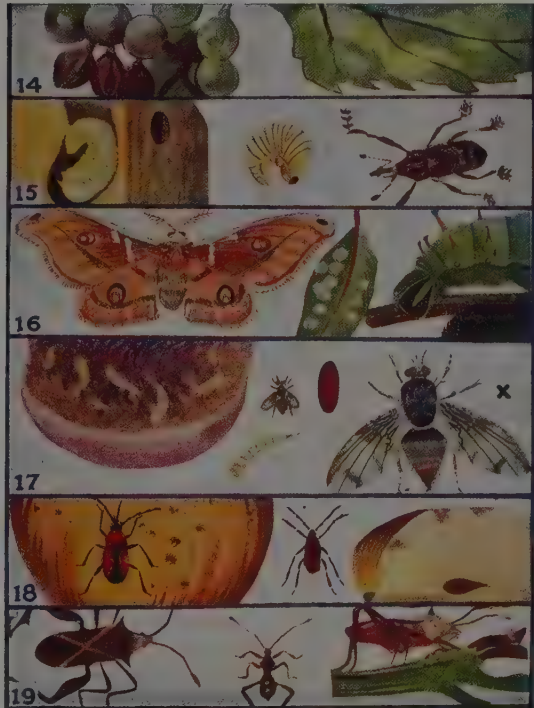
Elephant Beetle of Orange and Lemon.—A large brownish weevil with a long snout. This has become a serious pest to citrus trees. It bores into the trunks of the trees, causing them to die. It is also a pest of Elm and other street trees.

Emperor Gum Moth.—One of the largest Victorian moths. Grey in color with an eye-like spot on each wing, the larvae feed on Apple and Pear trees, also Eucalyptus and Pepper trees. Very destructive to Roses.

Fruit Fly.—The female punctures the fruit with its ovipositor, and deposits the eggs. Fruit is punctured in all stages, from green to ripe. The eggs hatch in two to five days in summer, and 10 to 15 in winter. In walking the wings are drooped. In summer the fly may complete its cycle from eggs to fly in 20 days.

Harlequin Fruit Bug.—These bugs, by making holes in the rind of the Apple with their rostrums (or sucking tubes), draw out the juice, causing the fruit to spot. They are also very destructive to garden plants, especially Dahlias, Tomatoes, etc.

Holy or Cross Bug.—This plant bug is a native insect and is very destructive to all kinds of Wattles (Acacias) and citrus trees. Like all plant bugs, this species sucks the sap with its rostrum or beak, causing the trees (twigs) to turn black and die down.

Pest or Disease. (X magnified.)

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Eminently suitable for dusty conditions, as are totally enclosed, bearings are dust-proof and automatically oiled. Start easier than a petrol engine, even below freezing point.

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Mr. J. Robinson, High Street, Scoresby, stores over 6,000 cases of fruit for £25 per year—a cost of one penny per case. The engine never gave the least trouble. Compare with your cost. **EASY TERMS. WRITE.** Please mention this advt.

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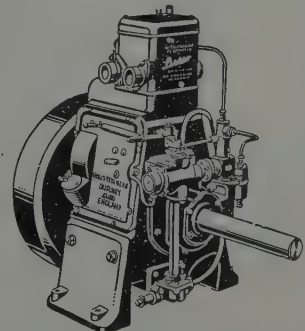
Mitchell Spray Plant With Lister Engine

LISTER ENGINE—The world's most reliable power. Totally enclosed. Dirt cannot harm it. Vertical cylinder.

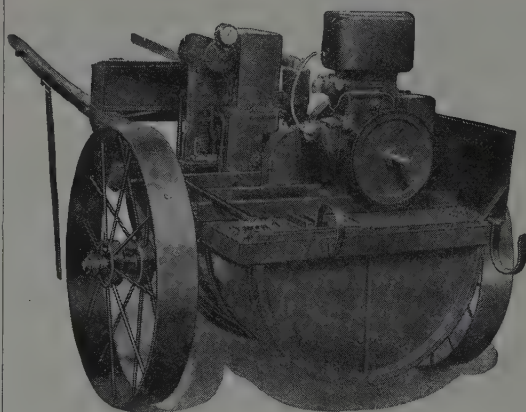
MYERS' TYPE PUMP—Cylinders porcelain lined. Valves and seats rustless steel. Gears nickel steel, machine cut, hardened. Pressure constant.

PRESSURE UNLOADER—Automatically relieves pressure on engine and hoses when spray is closed.

STRAINER—Easily cleaned, as placed on top of vat—not inside it.



3 to 38 H.P.



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The name of "Buzacott" on your spray materials or dusts is a guarantee of highest quality.

SPRAY MATERIALS.

White Oil (Emulsion) . . .	for Citrus
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Tar Distillate	for Aphis
"Supa Bordo" (Bordeaux) . . .	for Fungus Diseases
Lime Sulphur Solution . . .	for General Spraying
Colloidal Sulphur	for Summer Spraying
40% Nicotine Sulphate . . .	Contact Insecticide
Sulphur Smoke	Insecticide & Fungicide
Arsenate of Lead	for Codlin & Chewers

DRY DUSTS.

No. 4—Nicotine Dust for Sucking Insects.
No. 9—Combined Insect Dust for Chewing and Sucking Insects.
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No. 17—Chewing Insect Dust.
No. 18—Chewing Insect Dust (double strength).
No. 21—Blight, Fungus and Insect Dust.
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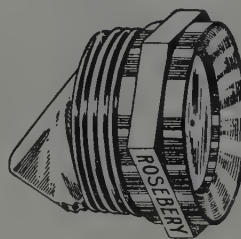
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Orchard Power Sprayers

- ◆ **ENGINE**—4 h.p. "Buzacott" Vertical Hopper Cooled.
- ◆ **PUMP**—Twin cylinder, totally enclosed, porcelain lined cylinders and with efficient pressure regulator.
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- ◆ **CONSTRUCTION**—Simple but solid and reliable. Vat of specially treated timber—all steel welded frame—robust axle and axle supports—sheet metal side shields—heavy roller chain drive with sheet metal housing.

All these and many other features make the W454 supreme in the field of Orchard Power Sprayers.

Write for the booklet "Still Another Step Forward" giving details of this and other orchard spraying outfits and it will be sent post free by return.



The "Rosebery"
Spray Nozzle gives a
driving mist spray,
and will not clog.



The "Edgell" Spray Pistol
eliminates the cumbersome
Spray Rod. With it one man
can do the work of three with
spray rods.

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).

Description of Pests as Illustrated.

Leaf Curl and Dieback of Peach.—When affected with Leaf Curl (*Exoascus deformans*), the first-formed leaves become thickened, puckered and discolored, and soon fall away. The fungus seems to winter in the buds.

Lemon Leaf and Peel Scale.—A small, dark-colored, mussel-shaped scale; the insect attacks leaves, bark and fruit of Lemon, Orange, Citron, Grapefruit, etc.

Light Brown Apple Moth.—These insects often attack late Apples, such as Yates, as late as March. Very destructive to Roses and garden plants.

Looper Caterpillar.—The caterpillar loops its body up when walking. Some caterpillars resemble dead twigs. They are native insects and are becoming a serious pest in many parts of Victoria.

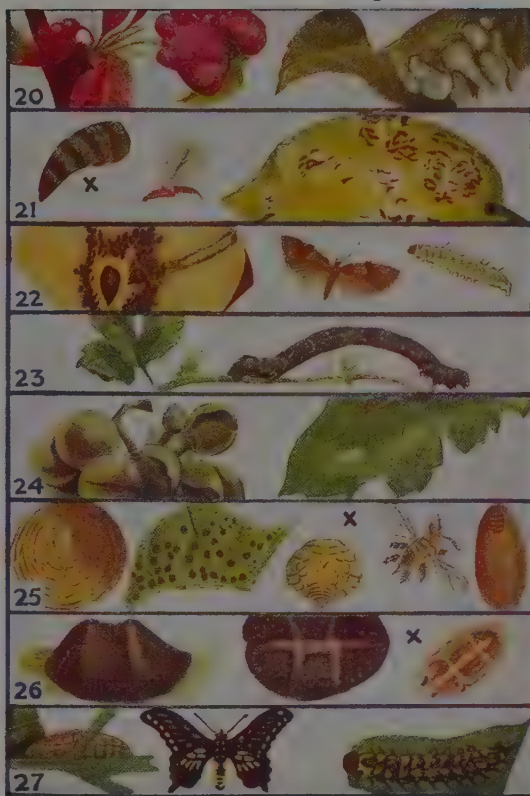
Oidium (Powdery Mildew of Vine).—This fungus appears during the growing season under sultry conditions, such as during a damp spring or after thunderstorms in summer. Dense undergrowth of weeds also tends to create conditions favorable for Oidium development.

Oleander or Round White Scale.—A small, light, greyish-brown, sometimes whitish scale, which attacks the leaves and stem, and is a most difficult insect to destroy when trees are badly infested with it.

Olive or Black Scale.—These destructive scales cause sooty fungus to develop on the leaves, making trees sickly. The scales are light brown when young with an H-like marking on back of scale.

Orange Butterfly.—In the warmer parts of Victoria these insects usually appear early in November. The yellow and black spiny caterpillars will attack Grapefruit if Orange or Lemon trees are not available; they attack the leaves, flowers and fruits of citrus.

Pest or Disease. (X magnified.)



Methods of Control of Insect Pests and Plant Diseases (illustrated above).

(20) **LEAF CURL AND DIEBACK OF PEACH.**—By spraying in the late dormant period, or when the earliest buds are showing the slightest trace of pink, Leaf Curl can be prevented. Use Bordeaux Mixture (6-4-40). Finish spraying by the "early pink" stage.

(21) **LEMON LEAF AND PEEL SCALE** (*Mytilapsis citricola*).—Thin out all dead or diseased wood. Spray with White Oil, 1-40, when trees are making decided growth. Make solution soapy by adding 4 ozs. of a good hard soap to each 40 gallons. Fumigate with Hydrocyanic Acid Gas.

(22) **LIGHT BROWN APPLE MOTH** (*Tortrix postvittana*).—This pest is very common in home gardens, attacking Roses, Dahlias, Tomatoes, etc. The caterpillar is very lively, and quickly escapes if disturbed. Spray with Arsenate of Lead, same as for Codlin Moth, No. 11.

(23) **"LOOPERS" OR LOOPER CATERPILLARS** (*Phrissogonus* sp.).—These attack fruit trees, particularly Apples, Pears and Cherries; and garden plants in the spring. Spray with Arsenate of Lead.

(24) **OIDIUM [Powdery Mildew of the Vine]** (*Oidium Tuckerii*).—Dust the vines with Flowers of Sulphur; first application when new shoots are six inches long; also dust with Sulphur just before blooming and after the fruit has formed. Keep vineyard clear of weeds.

(25) **OLEANDER OR ROUND WHITE SCALE** (*Aspidiotus hederae*).—Attack Orange and Lemon trees, also Oleanders and garden shrubs, palms, ferns, etc. Spray well with White Oil or Nicotine solution when young are hatching (in summer). Starch spray is also recommended. On Palms, Dracaenas, Ferns, etc., use the Starch spray.

(26) **OLIVE OR BLACK SCALE** (*Saissetia oleae*).—Attacks citrus, Apple, Apricot, vine, Olive, Pear, and Plum trees, also garden shrubs. Spray between November and March with White Oils. When young scale are moving is the favored time for their destruction.

(27) **ORANGE BUTTERFLY** (*Papilio anactus*).—Spray with Arsenate of Lead.

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It has been found in fruit-growing districts throughout Australia that wherever the NEPTUNE Spraying materials are used the orchardist has the reputation for possessing the healthiest trees, and producing the cleanest fruit.

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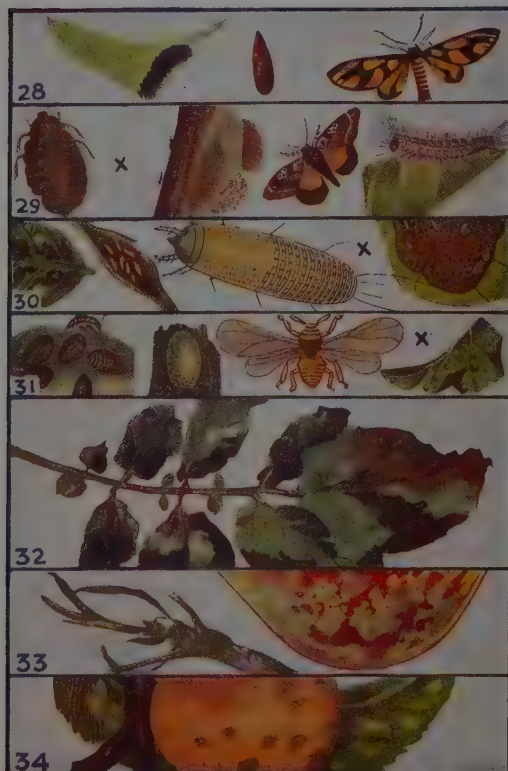
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Neptune Oil Company Ltd. All States

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).

Pest or Disease. (X magnified.)

Description of Pests as Illustrated.



Orange Moth.—The larvae of this moth feed on the leaves and young shoots, and is very destructive. The caterpillars of this moth destroy young flowers, buds and young shoots or Orange and Lemon, as well as the foliage.

Painted Apple Moth.—The caterpillars are covered with dark grey tufts of hairs on back near tail. They do great damage by eating the epidermis or surface of the leaves, also young shoots. These moths often appear when the flowers of Apples, Pears, Quinces, etc., are commencing to show. It may therefore be necessary to spray early.

Pear Phytioptus or Pear Leaf Blister Mite.—These mites, by sucking away the juice of the leaves, cause them to turn brown and nearly black. Also attacks fruit.

Phylloxera.—Attacks leaves and roots, growth becomes stunted, and leaves turn yellow.

Potato Blight (Irish).—Attacks Potatoes, Tomatoes, etc. The first indication seen on the leaf is a slight reduction in the intensity of the coloring matter, followed by the appearance of the brownish blotches at the edge of the leaf. In humid weather they spread with immense rapidity. The disease travels down the haulms, and the plant may within a few hours become a blackish mass, emitting an evil odor. Wet seasons favor the disease.

Powdery Mildew.—A serious disease, which attacks leaves, shoots, blossom-buds and fruits of Apples and Pears. Leaves and buds become covered with glistening white masses; fruit is disfigured and small.

Prune Rust.—Attacks Plum trees. Golden yellow pustules on young wood form cracks; sometimes twigs die. Hard scabs form on fruit—useless for canning. Leaf injury means poor crop next season.

Methods of Control of Insect Pests, as illustrated on opposite page.

(28) **ORANGE MOTH** (*Conogethes punctiferalis*).—Spray with Arsenate of Lead when observed.

(29) **PAINTED APPLE MOTH** (*Teia anartoides*).—Attacks fruit trees, also garden plants and shrubs. Spray with Arsenate of Lead, same as for Codlin Moth (see No. 11).

(30) **PEAR PHYTOPTUS OR PEAR-LEAF BLISTER MITE** (*Phytoptus pyri*).—Spray in spring, when buds commence to swell, Red Oil, 1-25, or Lime-Sulphur; the latter assists in checking Black Spot.

(31) **PHYLLOXERA** (*Phylloxera vastatrix*).—Plant Phylloxera resistant vines.

(32) **POTATO BLIGHT** [Irish] (*Phytophthora infestans*).—Spray with Bordeaux Mixture, 8-10-40. Commence spraying when the plants are from 4in. to 6in. high, and continue to spray every 10 days or two weeks, making in all five or seven sprayings. Use at least 80 lbs. pressure to the square inch, and the three-nozzle arrangement, so that the spray will be thrown each side as well as on top. For Potatoes, use clean seed dipped in Formalin.

(33) **POWDERY MILDEW** (*Poposphaera leucomotricha*).—In winter, prune off and burn infected shoots. Spray with Lime-Sulphur, 1-30, between open cluster and pink stage; Precipitated Sulphur, 10-100, at petal fall, and again (with the last-named spray) early in January. If disease is troublesome, middle of February.

(34) **PEACH RUST** (*Puccinia pruni*).—Spray Bordeaux, 6-4-40, at the pink bud stage and follow with Dry Mix Lime Sulphur as for Brown Rot.

DUSTING.

The method of dusting trees with insecticides and fungicides instead of, and in addition to, spraying, has met with favor. Points claimed in favor of dusting are its efficacy, ease of application, and consequent saving of labor; the dual application of powdered insecticides and fungicides in one operation.

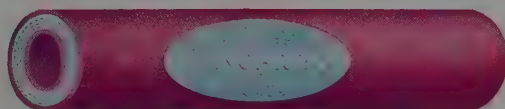
In vegetable and flower culture dusting is quite an accepted practice.

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SPRAY HOSE

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GENUINE CANVAS AND RUBBER



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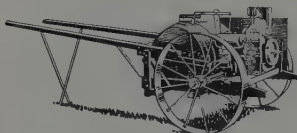
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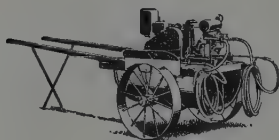


ARE YOU SUPPORTING A PROFIT-HUNGRY MACHINE ... Or Is Your Plant Supporting You ?

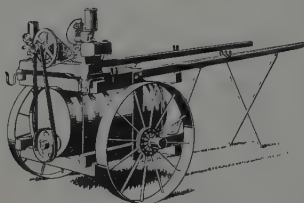
THERE'S a mighty big difference between the two ... the difference between profits and poverty, in fact an old, out-of-date machine eats up your profits with high costs and poor spraying, while an efficient, up-to-the-minute plant means faster, high-pressure, low-cost spraying and increased turnover, year after year, Which of the two is yours?



Type VF Spraying Plant.

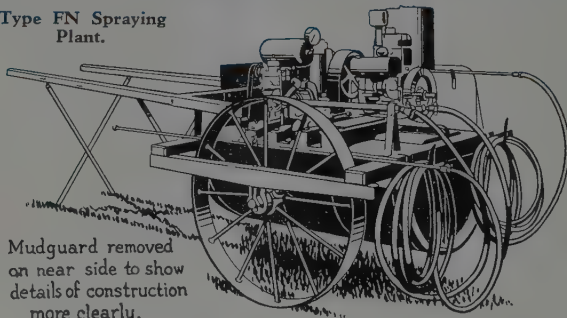


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A Size and Type for Every Spraying Requirement

The Ronaldson-Tippett line of Spraying Plants offers you the most comprehensive range of high-grade spraying plants obtainable. No matter what size your orchard, you will find a plant ideally suited to your requirements and conditions amongst these machines.

Specially for You

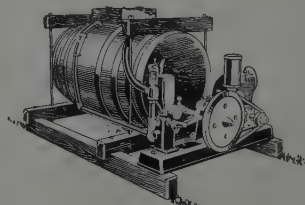
They are obtainable in both barrel and vat types with capacities from 60 to 80 gallons (barrel type) and from 100 to 200 gallons (vat type) in both portable and stationary types. The plants illustrated are only a few of those awaiting your inspection.

All Types and Sizes

These models are equipped with Ronaldson-Tippett vertical petrol engines, ranging from 1½ to 4½ h.p., according to size and type of the plant. Each and every one is strongly constructed of the highest-grade materials throughout and combines features which set an entirely new standard in spraying plants.

Will Save You Money

It is not so much a question of whether you can afford an efficient spraying plant as whether you can afford to be without one. Go over your figures for the last few years and you will see immediately the price you have been paying for that old plant you insist on nursing. Make up your mind once and for all ... out with the money-waster and in with a new Ronaldson-Tippett Spraying plant that will ensure your getting the best spraying possible and a good return on your investment.



Type VY Spraying Plant.

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Distributors in Brisbane, Sydney, Adelaide, Perth and Tasmania.

RONALDSON — TIPPETT

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).**Description of Pests as Illustrated.**

Red Mites, Bryobia, Etc.—The young mites are red, becoming brownish when fully grown. This species is larger than the common so-called "Red Spider." Eggs red, globular, these are often deposited on young fruit spurs and garden foliage.

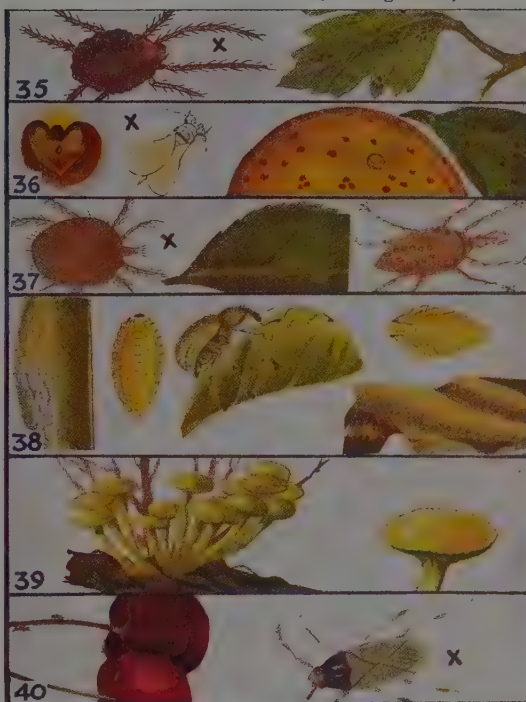
Red Scale of Orange.—A small reddish brown scale insect; attacks fruit, leaves and branches, also Roses and garden shrubs; spreads very quickly.

Red Spider.—The sap is sucked by numbers of these insects from the leaves, causing them to turn yellow. It is difficult for the amateur to locate the pest until a certain amount of damage is done.

Root Borer.—The grub attacks trees by tunnelling along the roots, and the beetle by eating the leaves. The beetle climbs the tree, fastens the leaves together with a gluey substance, and then lays her eggs. When hatched the young grubs drop to the ground and feed on the roots. The pest usually appears on the leaves for feeding in the spring.

Root Rot (Armillaria Mellea).—A destructive root fungus, which attacks all fruit trees and many garden plants.

Rutherglen Bug.—These plant bugs insert their beaks or rostrums into the fruit and extract the juice, causing the fruit to wither, become dry, and perfectly useless; they also attack flowers and vegetables, sucking the sap and causing the plants to wither. Usually appear in the summer.

Pest or Disease. (X magnified.)**Methods of Control of Insect Pests, as illustrated above.**

(35) **RED MITES, BRYOBIA, Etc. (Bryobia pratensis).**—They attack fruit trees, also garden plants, flowers, vegetables, etc. Spray with Lime-Sulphur or Red Oil, 1-20, when buds commence to swell. If mites are present on leaves in summer, spray with White Oils or Nicotine Solutions.

(36) **RED SCALE OF ORANGE (Aonidiella auranti).**—Spray same as for Lemon Leaf and Peel Scale. When young are hatching in summer Tobacco Sprays could be used. Fumigate.

(37) **RED SPIDER (Tetranychus telarius).**—Same as for Red Mites. (See No. 35.) For Red Spider on beans spray as above or dust with finely powdered sulphur.

(38) **ROOT BORER (Leptops squalidus).**—Attacks Apples, Pears, vines, etc. Place a 3½ in. zinc band round tree trunk 18 in. from ground. Destroy all beetles observed. Keep orchards clean in the spring, as the insects lay their eggs on weeds, leaves, or suckers. Spray with Arsenate of Lead. Hymenopterous (wasp) parasites are valuable. Jar the trees over a blanket; gather and destroy the beetles.

(39) **ROOT ROT (Armillaria mellea).**—Remove and destroy affected trees in order to prevent the disease spreading and dress the soil with Sulphate of Iron and Quicklime before replanting.

(40) **RUTHERGLEN BUG (Nysius vinitor).**—Spray with Benzole Emulsion, Nicotine Solutions, when the bugs appear. Apply Pyrethrum or Nicotine Dust. Keep down weeds. Smudge fires will drive them away from orchards. As a deterrent, spray with Benzole Emulsion.

Mealy Bug (Pseudococcus longispinus).—Small destructive insects, light yellow to grey, covered with powdery substance. Spray with tobacco preparations, or benzole emulsion.

Pear Root Aphis (Eriosoma pyricola).—Closely allied to woolly aphis; the former works entirely underground. Scatter paradichlorobenzene (P.D.B.) on surface of soil and dig in, or place in hole 6 in. deep excavated around tree. Use 3 to 10 oz. P.D.B., according to size of tree. Dip young trees before planting in tobacco water or red oil solution.

The Dicky Rice Weevil attacks citrus trees. Spray with arsenate of lead, 1-20, as soon as observed (generally early in November).

Cooper Sprays

Are Definitely Superior

COOPER'S

- **ARSINETTE** Specially prepared Arsenate of Lead Powder, unsurpassed for fineness of particles. Used for the control of all chewing grubs and insects. Packed in $1\frac{1}{4}$ cwt., 1 cwt., 28 lb. and 4 lb. and 1 lb. units.

COOPER'S

- **ALBOLEUM** Emulsified White Oil. Safe to use on all classes of fruit trees and shrubs at any season of the year. Used for the control of scale pests and as a general tonic. Controls Red Spider and Aphis.

Packed in 44 gall., 5 gall., 2 gall., and 1 gall. containers

COOPER'S

- **BORDINETTE** Ready prepared Copper Fungicide. Mixes immediately with cold water and is then ready for use. For the control of all Fungous Diseases of plants for which a Copper spray is advocated. Dilution 1 lb. to 10 galls.

Packed in 56 lb., 28 lb., 4 lb. and 8 oz. containers.

COOPER'S

- **COLLOIDAL SULPHUR** Pure sulphur in semi-paste form. The finest form of sulphur ever produced, the particle size being less than one 25,000th part of an inch. Safe to use at all times. Controls Mildews, Spots, Brown Rot of Stone Fruit and other diseases for which sulphur in any form is used.

Packed in 56 lb., 28 lb. kegs and 7 lb. and 3 lb. jars. Dilution 2 lb.-100 galls.

COOPER'S

- **DRYMAC Derris Dust** A standardised non-poisonous dusting powder of proved efficiency for the destruction of insect pests attacking vines, vegetables and flowers, particularly cabbage moth caterpillars, aphis, thrips, beetles, etc.

Sold in 112 lb. bags, 56 lb. cases, 7 lb. and 2 lb. and 1 lb. cartons.

COOPER'S

- **OVICIDE** The original Tar Distillate Wash. Used all over Australia for the control of aphis and other overwintering pests. For dormant spraying only.

Packed in 44-gall., 5 gall., 2 gall. and 1-gall. containers. Dilution 1 gall. to 35 gall. water.

Also **KATAKILLA**: non-poisonous derris spray; **NICOTINE**: 40 per cent.; **WEEDICIDE**: weed and scrub killer; **APPERITE**: soil fumigant; **WORMKILLER**: for lawns, etc.; **SOIL STERILISER**, etc., etc.

William Cooper & Nephews (Australia) Limited, Sydney

(Manufacturers of Standardised Horticultural Remedies)

Victorian Distributor: F. R. MELLOR, 440 Elizabeth Street, Melbourne, C.1.

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).**Description of Pests as Illustrated.**

San Jose Scale.—Attacks fruit trees—Pear, Apple, Cherry, Plum, Apricot, etc., also Roses, shrubs and hedge plants. A small scale insect of light orange color; attacks trunk, limbs, foliage and fruit. Is very destructive. When Apples and Pears (fruit) are attacked, light red rings appear on the fruit around the scales.

Scab of Orange and Lemons.—Lemon Scurf, dingy white scurfy patches. Grey scab of Orange, the patches are flat, almost round, and break up into minute flakes. Greyish-brown scab of the Lemon occurs on both ripe and green Lemons. False Melanose is another form of scab.

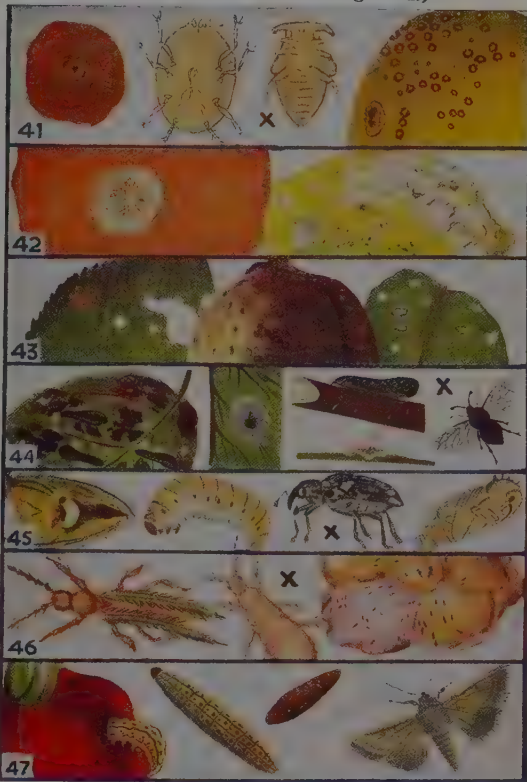
Shot Hole.—Attacks blossom, leaves, twigs and sometimes fruit of Apricot, Cherry, Plum, etc. Blossom infection looks like frost injury. Leaf infection occurs very early, often reducing leaves to skeletons. Gum often exudes from ruptured bark. Scabbiness appears on Apricot fruit.

Slug of Pear and Cherry.—The larvae attack the leaves, doing serious mischief by devouring the skin of the upper side of the leaf. The underside is left untouched, and turns to a deep brown color. They attack the tree mainly in late spring, when the foliage is young.

Strawberry Beetle.—In November and December these insects do most damage; the beetle attacks the leaves and flowers, and the larvae bores into the plant.

Thrips.—One of the worst insect pests. All kinds of fruit, flowers and vegetables, especially Onions, are attacked.

Tomato Moth.—The eggs of this moth are deposited on leaves and stem. The young larvae crawl up the stem and eat their way at once into the flesh, which is destroyed. There is scarcely any limit to the number of plants this pest will attack, cereals, maize, vines, garden plants, etc.

Pest or Disease. (X magnified.)**Methods of Control of Insect Pests and Plant Diseases (illustrated above).**

(41) **SAN JOSE SCALE** (*Aspidiotus perniciosus*).—Burn all prunings promptly. Spray in late winter with Red Oil, 1-20 or Lime-Sulphur, 1-10. In summer, when scales are moving, spray with White Oils or Nicotine.

(42) **SCAB OF ORANGE AND LEMON.**—As this disease attacks new growth, spray with Bordeaux (3-3-50), to which has been added 1 per cent. of Red Oil, before the new growth begins.

(43) **SHOT HOLE** (*Coryneum Beijerinckii*).—Spray Bordeaux, 6-4-40, before leaves fall in autumn; 6-4-40 at "pink" stage. Use lime casein spreader with the Bordeaux mixture.

(44) **SLUG OF PEAR AND CHERRY** (*Caliroa cerasi*).—Cherry, Peach, Quince, Plum and other trees are attacked. Spray with Arsenate of Lead. The first spray for Codlin usually kills the Pear Slug. Spray unbearing trees or Hawthorn hedges if necessary. Dust with lime, powdered Lead Arsenate, Sulphur, ashes, or sand.

(45) **STRAWBERRY BEETLE** (*Rhinaria perdis*).—Spray with Arsenate of Lead before fruit is ripening. As a deterrent, spray with Benzole Emulsion.

(46) **THRIPS.**—When not in plague numbers, thrips do not seriously affect fruit crops. Scientific investigations prove that plague infestations as well as freedom from the pest, can be forecast from the numbers of insects present in the autumn and early spring. Pyrethrum and derris dusts kill thrips and act as repellants for two days with each application.

(47) **TOMATO MOTH** (*Heliothis armigera*).—Use poisoned baits, bran and arsenic, also Arsenate of Calcium. Spray with Arsenate of Lead or dust with powdered Arsenate of Lead. Keep soil around plants well forked.

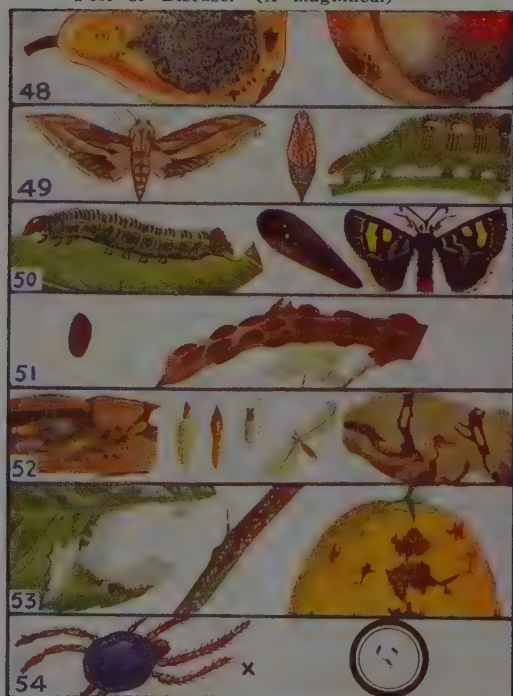
FUMIGATION.

Fumigation with Hydrocyanic Acid Gas kills red scale of citrus trees and various other scales and pests. In Victoria fumigation is compulsory. Tents are placed over trees, calcium cyanide dust, 1 oz. per 100 cub. feet, is forced in by means of a hose and blower. On being released to the air hydrocyanic acid gas is formed. This has largely superseded the "pot" method of mixing cyanide, sulphuric acid and water.

Fumigation is done (on still nights) from late December to early June; the temperature should not be below 50 deg., and humidity should not exceed 80 degrees.

CLASSIFIED INDEX OF ORCHARD PESTS AND DISEASES (Continued).

Pest or Disease. (X magnified.)



Description of Pests as Illustrated.

Transit Rot.—Attacks fruits only through skin injury. It appears as a cottony mould, at first white, but quickly changing to black. The fungus produces a rot which at first is brown and quite firm; then the cells rapidly break down and the fruit becomes a watery mass.

Vine Hawk Moth (Silver Striped).—The caterpillar of this moth strips the vines of their leaves in a very short time, even quicker than the caterpillar of the Vine Moth.

Vine Moth.—The caterpillar, or larvae, of this moth attacks the leaves and young Grapes, also Virginia Creeper, and will very quickly denude the vines and creepers of their foliage.

Vine Scale.—One of the largest scales infesting plants. Attacks vines, Jap. Plums, etc. This scale has become a pest in flower gardens. Many kinds of creeping plants, viz.:—Tacsonia, Abutilon, Mandevillea, Cobaea, etc., being attacked.

White Ants.—This destructive pest attacks timber trees, vines, Apricot, Orange and Peach trees, also furniture, etc.; is a very serious enemy.

Wither Tip of Orange and Lemon.—Often called "Dieback," as twigs die from the top downwards. ("Dieback" of Apple trees may be associated with this disease.) On the undersurface of the leaf whitish grey blisters arise. The leaf withers at the tip and is gradually destroyed; blotches appear on stem.

Pea Mite.—A serious pest. The body of this mite is dull blue. They have rather long red legs. They run very rapidly when disturbed, and soon get out of sight, hiding in crevices or under lumps of earth.

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Methods of Control of Insect Pests, as illustrated on opposite page.

(48) **TRANSIT ROT** (*Rhizopus nigricans* Ehr., *Rhizopus arrhizus* Fisch).—Handle fruit carefully, preventing skin injury. Sterilise cases in boiling water. Spray shed interiors and all wood-work with 1 lb. bluestone to 5 gallons water. After picking and packing, pre-cool fruit immediately for two days at 35 deg. F., and transport to market in iced insulated trucks or louvre trucks.

(49) **VINE HAWK MOTH, SILVER STRIPED** (*Charocampa celerio*).—Spray with Arsenate of Lead, whenever observed.

(50) **VINE MOTH** (*Phalænoides glycine*).—Spray with Arsenate of Lead, whenever observed. Keep soil at the foot of the vines worked up to destroy chrysalids in soil.

(51) **VINE SCALE** (*Eulecanium persicae*).—Sprays same as for Olive or Black Scale. Spray in summer when young are observed with Tobacco extract.

(52) **WHITE ANT OR TERMITE** (*Termes lacteus*).—Apply Manurial Insecticides or Kainit to roots. Inject Carbon Bisulphide if nests located.

(53) **WITHER-TIP OF ORANGE & LEMON** (*Phoma omnivora*).—Prune out all diseased

wood and spray with Bordeaux Mixture (6-4-40) or Copper Soda (6-9-40).

(54) **PEA MITE** (*Penthaleus major*).—Attacks Peas, Onions, Potatoes, Beans, Beet, etc., also flowers. When mites appear, plough deeply and destroy all weeds, particularly Capeweed as the mites breed on these. They will not live for any length of time on clean cultivation, but fairly quickly migrate across it from pasture paddocks, dirty headlands, etc. Any plot freed from mites by cultivation or other treatment may be kept free by placing a trail of Creosote, or a mixture of Kerosene and Phenyle, about four inches wide, right across the plot. The mites will not be able to cross this for a few weeks.

Take 1 part of Carbolic Powder (15 per cent.), 3 parts Lime, Super. of Gypsum, and broadcast over the plants, and work into soil at the rate of 2 cwt. per acre.

Tobacco Dust (Pestend) and Lime in equal quantities have been used in a similar way with some success by market gardeners. Manurial Insecticide used at the rate of 1½ to 2 cwt. to the acre has also been fairly effective in some parts.

Spray with Nicotine solutions.

Dust with Nictar dust.

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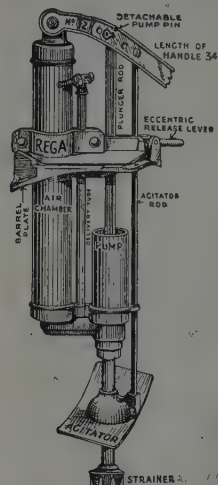
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The Illustration shows the BAVE-U Spraying of Noxious Weeds by the Lands Dept. in the Calignee District.

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EDITORIAL

IT IS A PLEASURE to launch the 1937 issue of the "Fruit World Annual," and the Editor and staff would like to thank the contributors and all who have assisted in its production, as well as our many readers, who have expressed appreciation for this type of publication. The kind reception from readers of previous issues of the "Annual" encourages the publishers in producing this edition, which is now placed in the hands of subscribers.

While Australia is geologically a very old country, its development is comparatively new from the national point of view. This is emphasised by the recent Centenary celebrations in two State capitals. We are still pioneers, carrying on the traditions of our virile British ancestry.

As regards the fruit industry it will be observed that Australia has no native fruits. The pioneer nurserymen and growers had much to learn in the way of trial and error. A fascinating story in this connection remains to be written. First came the supplying of the home markets with healthful fruits, then an export trade was developed, until to-day we find ourselves in the position of needing to stimulate our home consumption to take care of the huge quantities of fruit which are being produced in all the States.

* * * * *

FORTUNATELY, SCIENCE is on the side of the producer of fruit and vegetables. Nutritional research in various parts of the world has revealed the outstanding importance of these products from a food and health point of view. Never again will the advocates of the simple diet be dubbed "food faddists." The League of Nations is giving a lead in these matters, especially shall we say on behalf of the children, for these are the men and women of to-morrow, and hold the destiny of the world in their hands. To have healthy children there must be in their diet a preponderance or more plentiful admixture of fruit and vegetables. Athletic young men and women of to-day can only keep at the top of physical condition by having in their diet plenty of fruit—fresh, canned and dried—also salads and vegetables; whilst those in the prime of life and past middle age should need no reminder of the virtues of these most kindly gifts of Nature.

Yet the story needs to be told. Much educational work remains to be done. Hence the emphasis which is being laid by leaders of the industry on the necessity for an educational publicity campaign to increase the consumption of fruit. A fractional increase in the consumption of fruit per head of population will lift the whole tone of the industry, relieve the producers from a difficult situation, and in the performing of this national service, the health of the people will be increased. The leadership provided by the Australian Apple and Pear Export Council in this connection is surely welcomed. The home market is the best market, and its development is the most important matter confronting at least the fresh fruit growers to-day—particularly the Apple grower.

THE EXPORT TRADE of Australian fruit—fresh, dried and canned—is revealed in the statistics in this issue of the "Annual." The various organisations which have been set up to supervise exports are to be congratulated on the success of their efforts. From the ranks of the industry leaders have emerged, men of vision, foresight and courage, who have shown their ability to handle local problems and to represent Australia at Empire Conferences. This is no mean achievement, and it augurs well for the future.

The Federal and State Governments, too, have shown the greatest interest in all matters pertaining to the welfare of primary producers. It is not forgotten that there is a national policy of maintaining an exchange rate which benefits the exporter. Not only have the responsible Ministers displayed their interest in primary producers, but keen appreciation must be expressed for the services of the permanent Departmental staffs—men who have won and maintained the esteem of the producers and the public.

As regards fresh fruit, the main exports are of Apples and Pears, and there is one matter which demands attention, and that is the rate of freight. Surely ship owners will realise in their own interests as well as in the interests of the industry that the realisation value of the products have a vital bearing. With butter and eggs the freight is 9 per cent. of the London realisation values, but with Apples the freight is 50 per cent. It is beyond the power of the industry to continue in this way, and the time is overdue for a reconsideration of this matter.

* * * * *

SCIENTIFIC RESEARCH into horticultural problems has brought about many valued improvements, yet there is a vast field of endeavour awaiting attention. Fruit producers value very highly the services of the Federal and State Governments, and the Council for Scientific and Industrial Research in this connection, and the hope is earnestly expressed that there will be an active increase in the matter of scientific study to solve the many problems of the producer. It is national work of value not only to the producer, but to all citizens.

* * * * *

WE ARE LIVING in a world of rapid changes, economic and social. None can foresee the developments within the next ten or even five years. Advocates there are of varying remedies for our social and national disabilities. We need to exercise toleration and goodwill to all. Yet can it be doubted but that the new Pacific era is dawning. There is the awakening of the East, and it may yet be that Australia, this outpost of the British Empire in the South Pacific, may yet have a big task in leadership and the guidance of national destinies—educational, social, and in matters of trade.

Can we envisage the ideals of better international understanding based on social justice and the brotherhood of man? Who has a better programme than is contained in the golden rule, and the ideal of peace on earth and goodwill to men?

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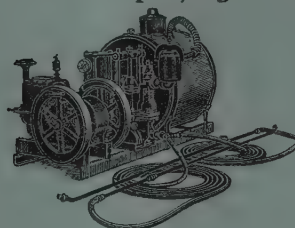
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The Australian Fruit Industry

Review of Production
Varieties, Yields, Values, etc.
Principal Fruits Grown in
Various States

WITH practically every variety of climate in its almost 3,000,000 square miles of territory, Australia is particularly suited for the production of a great variety in its fruits. Tropical fruits in the north, cold-climate fruits in the extreme south, and upon the mountain foothills with intermediate varieties in suitable soils in every state, all spell success to fruit-growing under ideal conditions.

1936 has been a remarkable year in some ways. In orchards there were 802 more acres in bearing than in the previous year, but the yield was slightly less, although the gross value increased by a quarter million pounds.

In a comparison of the areas planted, the order of the States remains as at last year, and expressed in round figures, to the nearest thousand acres, it is:—N.S.W., 87,000 acres; Vic., 76,000; Tas., 34,000; Q'land., 30,000; S.A., 29,000; W.A., 21,000; F.C.T., 70 acres; a total of all planting for orchard fruit of 277,762 acres.

In dried fruits, Raisins dropped below the previous two years' production figures, but Currants created a

record production. Taking the average over the past 10 years, both Raisins and Currants were well ahead last year.

Vineyards reached their record acreage during the year with 117,347 acres under production, an increase of about 1,000 acres over the previous season, or 3,000 acres above the average acreage for the past ten years.

Although S.A. produced more wine (13 million galls.), in the gross value of Grape culture, Victoria received a return of £42 per acre; W.A., £38; Q'land., £35; S.A., £24 and N.S.W., £22.

Varieties, Yields, Values, 1935-36.

The approximate acreage under production of fruits, the quantities produced, and the values to Australia of the several varieties, is graphically shown in the following table, under each contributing state. The figures are taken from the Production Bulletin of the Commonwealth Bureau of Statistics, issued July 22, 1936, and refer to the latest records available, representing the year 1934-35.

Comparative Acreage in Ten Years

Year.	N.S.W.	Vic.	Q'land.	S.A.	W.A.	Tas.	F.C.T.	Total.
Orchards—								
1925-26	74,532	82,665	33,520	32,276	18,355	33,891	—	275,245
1935-36	87,035	76,254	30,646	29,167	20,811	33,779	70	277,762
Vineyards—								
1925-26	14,737	42,467	1,579	50,280	5,331	—	—	114,394
1935-36	15,143	41,180	1,926	53,361	5,737	—	—	117,347

Expressed in both acreage and production value, a comparison covering ten years between 1925-26 and 1935-36 would appear as follows:—

	Orchards.			Vineyards.			Total.	
	Acres.	Value.		Acres.	Value.		Acres.	Value.
1925-26	275,245	£8,043,149	..	114,394	£3,866,116	..	387,942	£11,909,265
1935-36	277,762	£7,343,239	..	117,347	£3,600,000	..	395,109	£10,943,239

Vineyards and Wine.

During the past ten years the area under vines in the Commonwealth has increased by 2,953 acres, of which increase S.A. has contributed most. Singularly enough the value has not risen commensurately with the increased acreage and is now recorded as lower than in 1926.

Taking the earliest records available (1860) and recording five-year reports from 1920 to 1935, a table of areas under vines would read as follows (no vineyards in Tasmania):—

Year.	Area Under Vines.						Total.
	N.S.W.	Vic.	Q'ld.	S.A.	W.A.		
1860	1,584	1,138	—	3,180	—	5,902
1920	10,783	29,255	1,256	36,661	3,210	81,165
1925	14,737	42,467	1,579	50,280	5,331	114,394
1930	15,589	40,594	1,749	52,329	4,964	115,525
1935	15,143	41,180	1,926	53,361	5,737	117,347

From the above it will be seen that all States recorded a steady increase in acreage each five-year period, except N.S.W., which has decreased slightly in the past five years.

The quantities of Grapes converted into wine in similar periods is also interesting and shows the tremendous development made by South Australia in wine production during the past three periods. In addition to the following quantities of wine, the conversion of vine fruits into Raisins and Currants has grown from 1,645 cwts. in 1860, to 1,335,000 cwts. in 1935, besides a huge quantity of fresh table Grapes consumed in season, approximately 16,000 tons in 1935.

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PHONE RYDE 70

Year.	Production of Wine. (Gallons.)						Total.
	N.S.W.	Vic.	Q'ld.	S.A.	W.A.		
1860	99,791	12,129	—	182,087	—	294,007
1920	674,188	2,222,305	71,403	7,893,345	152,979	11,014,220
1925	1,240,893	1,637,274	39,375	13,074,874	238,726	16,231,142
1930	1,335,882	1,254,615	48,899	10,131,034	307,788	13,078,218
1935	1,539,274	1,276,176	38,050	12,914,905	496,252	16,264,657

Wine Exports.

The export of Australian wines overseas has increased, as the following brief summary shows, although the peak year (1931/2) eclipses last year's production.

Year.	Quantity (Gallons).			Value Australian Currency.		
	Sparkling.	Other.	Total.	Sparkling.	Other.	Total.
1928-9	2,932	1,738,047	1,740,979	£5,685	£495,299	£500,984
1931-2	4,123	3,471,462	3,475,585	£6,705	£901,837	£908,542
1934-5	3,748	3,390,849	3,394,597	£4,965	£805,056	£810,021

Brief Review of Fruit Industry by States

Main Varieties in All States

Apples the Predominating Production

AUSTRALIA is particularly blessed by having a great variety of natural soil conditions a climatic range and vast territories which include temperatures representative of both temperate and sub-tropical zones. Consequently her production of fruit varieties is scarcely equalled in any other country in the world. Here can be found conditions favorable to the production of almost any variety of fruit, and seasons which make possible a perpetual supply of some form of fruit in season for her fortunate inhabitants as well as a prolific harvest which enables her to maintain a valuable export market to less blessed countries.

Separated into State divisions, the following very brief review tells the story of her versatile fruit production.

Queensland. — Pineapples and Bananas are still this State's chief products, but in extending into sub-tropical latitudes, the northern State also produces delicious tro-

pical fruits of all kinds and has established a good trade with the more southern States in these varieties. A fair quantity of Apples, Oranges, Peaches and Plums are also cultivated. Its chief fruits are produced on the following acreage: Apples 5,373, Bananas 10,323, Citrus 3,560, Pineapples 5,584, Peaches 1,794, Plums 1,295, giving a total of 30,646 acres. Vine fruits are represented by only 1,926 acres.

New South Wales.—Citrus fruits comprise the largest proportion of this State's fruit products. The northern coast areas however, are increasing Banana production, whilst Cherries from the Orange area are becoming increasingly popular. In the Murrumbidgee Irrigated Areas increased activity is seen. The main varieties of fruit produced are from: Apples 16,341 acres, Bananas 16,072 acres, Cherries 3,644 acres, Citrus 29,735 acres, Peaches 6,626, Pears 3,078 acres, Plums 2,684, Prunes 3,083 acres, making a total of 87,035 acres. Besides which 15,143 acres are devoted to vine fruit production.

Victoria.—Apples, Pears, Peaches and Apricots constitute the main varieties of this comparatively small State. Australia's canning industry is most strongly established in this State, and its modern canneries add much to both the local consumption and export trade in canned fruits. The area under production for the main varieties include: Apples 30,839 acres, Citrus 7,066 acres, Peaches 12,137 acres, Apricots 4,081 acres, Pears 11,492 acres, Plums

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3,690 acres or a total of fruits (other than vines) of 76,254 acres, and vine fruits represent a total area of 41,180 acres.

South Australia is noted for its prolific vineyards, and this Central State produces the majority of the wines made in Australia. Its citrus fruits are also well known and represent a total acreage at present of 5,317 acres. The chief varieties of fruits produced are borne on the following acreages: Apples 10,717, Citrus 5,317, Peaches 1,580, Pears 1,892, Plums 2,674 or a total (excluding Grapes) of 29,167 acres, whilst vine fruits cover a total area of 53,361 acres.

Western Australia.—In the South West of this big State, Apples have created a name for quality; citrus fruits from Harvey and Gingin, Grapes from the Upper Swan districts, all contribute to a growing fruit industry in the Western State. In reviewing this State during the past twenty years, it is interesting to note that the population has increased 30 per cent., and with this has come an increase of fruit production by 100 per cent. Apples contributed the greatest increase by growing from half a million cases to one million cases in that period. This has been accomplished, not by a great increase in acreage (representing only about 556 acres), but rather by better husbandry and greater yields per acre. Pears have produced very little more fruit than 20 years ago, Oranges have increased in production from 150,000 cases to 270,000 cases. Acreages under Peaches, Plums and Apricots have decreased, but Grape culture has increased in the 20 years period by over 100 per cent. to 5,736 acres. Bananas, which formerly were all imported, are now being grown on the North-west coast lands and will soon be able to supply all local demands. The same report applies to Pineapple production.

The chief varieties under acreage (excluding Grapes) in 1935 were: Apples 12,450 acres, Citrus 3,569 acres, Pears 1,018 acres, Plums 1,014 acres, with a total acreage of all fruits of 20,811 acres. Vine fruits represent a total acreage of 5,737 acres.

Tasmania.—Literally the Apple Island, Tasmania is noted all over the world for the Apples, which it produces under such ideal conditions. It has no vineyards, but grows many varieties of berry fruits; 80 per cent. of its fruit products are Apples, but it also produces Pears, Apricots, Plums and Cherries. Tasmanian jams can be found in many overseas markets. The little island is cultivated for its main fruits on: Apples 26,645 acres, Apricots 1,447 acres, Pears 2,254 acres, Raspberries 1,383 acres, other small fruits 1,212 acres, or a total of 33,779 acres, making it the third largest producer of fruits in the Commonwealth.

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Planting Fruit Trees

IN THE PLANTING OF FRUIT TREES, matters of fundamental importance come under consideration.

It goes almost without saying that only the best trees from reliable sources should be planted. Expert nurserymen have built up their businesses in supplying these high quality trees. Many of them are also substantially interested in the fruit-growing industry, thus enabling them to observe how varieties behave on different stocks under varying circumstances.

Apart from the question of stocks, about which much could be written at length, there is the question of buds from proved bearing trees which also brings with it the important point relative to strains. To quote two examples amongst many, there are known to be strains of the Jonathan Apple which produce flatish Apples much of the shape of the London Pippin, as distinct from the typically approved and familiar conical Jonathan type. Further it is reported that in the Harcourt district of Victoria there are at least three distinct strains of William's Bon Chretien Pear. This question of strain and trueness to type is of as much importance to the deciduous fruit industry as with citrus trees, in particular the proved importance of selected buds from the Washington Navel, Valencia and other types of Oranges, as well as citrus trees generally.

Much research work is awaiting attention in this connection. Good work has been done at the Governmental experimental orchard at Blackwood in South Australia, as well as at the research orchards in N.S.W. and elsewhere.

A start is being made in laying out an experimental orchard at Tatura, in Victoria, where the Victorian Government has reserved 104 acres for this purpose. The importance of this experimental orchard to observe conditions of fruit growing under irrigation in the fertile Goulburn Valley cannot be over-estimated.

At the same time pressure is being brought to bear for the establishment of an experimental orchard in Southern Victoria or other suitable area for studying fruit cultural conditions, particularly Apples and Pears, as well as other fruits.

Buds and Strains — Importance of Early Planting — Hints on Correct Cultural Operations—Varieties for Cross-Pollination —Number of Plants and Trees to the Acre

...Need for More Research Work

ON THE SUBJECT of fruit tree planting, Mr. H. Norman Wicks, nurseryman and fruitgrower, of Balhannah, South Australia, writes as follows:—

While a great number of my clients are experienced orchardists and fruitgrowers, who have become acquainted with the fundamentals of tree-planting through the hard school of experience, and who have little or nothing to learn in this respect, I am constantly coming in contact with others who are beginners and anxious to glean all the information possible, and to these latter are the following remarks addressed.

A Word With Regard to Cheap Trees.

Quality in fruit trees, as in any other commodity, costs money to produce; but money spent on quality, especially in fruit trees, is without question a safe and sound investment. The sole purpose of planting fruit trees is to produce revenue, and to cultivate them so that their revenue-giving qualities increase each year; therefore it is indeed poor business to plant cheap trees from unreliable sources and run the risk of discovering after perhaps five or six years that they are not true to name.

Being confident that the

Importance of Early Planting

is, in a great number of instances, not fully realised, I venture to make the following remarks with regard to the matter, in the hope that same may be of assistance to any who are in doubt with regard to the best time to plant.

In districts with an average rainfall of 25 in. or under, there are usually great benefits to be obtained by early planting of deciduous trees. To persons who have studied the habits of deciduous fruit trees, it is well known that, although the top portion of the tree appears dormant for three or four months during the winter, the roots do not have a dormant period of more than a few weeks. I have known trees to have a very visible growth of new roots when removed from the nursery bed early in June. Immediately these tender hair roots are exposed to the air they perish, and the tree loses that amount of vitality and has to start afresh. It can therefore be readily seen

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that if a tree is planted in a warm, moist soil, say at the end of May, or early in June (providing, of course, that a good rain has taken place, sufficient to thoroughly moisten the soil down to the subsoil), it will be well established in its root system by early Spring, and extra growth and vigor will be the result.

Very Late Planting.

It sometimes occurs that owing to unavoidable circumstances, planting may be delayed, and although the planter is very anxious not to lose a year, he is compelled to do so owing to the fact that the trees become too far advanced to be transplanted with safety. This can now be easily overcome with very little cost. Should a grower find himself in these circumstances, his trees can be placed in cold storage, where they will remain in perfect condition for a long period, and may then be planted with safety, providing, of course, reasonable care be exercised. It is essential that trees should be placed in storage before they start into growth.

Receiving Trees from Nursery.

Upon receipt of trees from the nursery, moisten the roots, but do not leave the trees standing in water. If they are all to be planted within a few days, keep the roots covered with damp bagging, straw, or some similar substance, and keep them in a sheltered place away from winds.

Plunging or Heeling In.

If the trees cannot be planted for some little time, place them in an upright position in a shallow trench about 2 ft. wide and 6 to 9 in. deep, and then shake loose earth in amongst the roots, completely covering them with moist soil. Firm them a little, and be sure the soil is kept moist. In this manner it is possible to plunge hundreds of trees in a few feet of ground, and they

will be quite all right for a long period during the Winter months, and by employing this practice the planter has his trees handy, and can make the best use of every opportunity he has for planting. This is termed plunging or heeling in, and is the usual practice of nurserymen when assembling orders, and I feel sure that if planters would take early delivery of their trees and employ this method of holding them they would find that a great deal of the worry and trouble of planting would be eliminated because of the absence of the need to rush the matter through.

Preparing for Planting

PREVIOUS TO PLANTING, the soil should be thoroughly broken up as deeply as possible. Subsoil ploughing is to be highly recommended.

The ground cannot be worked too much prior to planting, and a year's fallowing, although not essential, is very beneficial.

If the soil is well and deeply tilled, as it should be, it is not necessary to take out a larger hole for planting the tree than the size of the roots demand. Mr. G. C. Roeding, one of California's most prominent nurserymen and fruitgrowers, states with regard to this matter:—"Nothing is so beneficial as subsoiling, though planters are often disposed to avoid this additional expense, but where time and conditions will permit, it will do more to promote a fine deep root system and an unusually heavy growth, than any other one thing that can be done in the preparation of the soil."

Planting.

To plant the tree, break up the bottom of the hole as deeply as possible, and leave the soil a little higher in the centre. Shorten back the roots before planting, taking

care to remove with a sharp knife or secateurs all bruised portions. Mix two or three good double handfuls of bonedust in with the soil as it is filled in, making sure that it is well stirred through the loose earth.

There are several methods of marking off the land to be planted. If the ground is very flat, with no undulations, a chain or wire marked off with the distances the trees are to be apart can be employed satisfactorily, after determining three of the boundaries, which must be proved to be at right angles to one another.

After marking the two opposite boundaries with pegs at each spot where a tree is to stand, a start can be made from the third boundary, which forms the base, and by stretching the chain between the pegs on the two opposite boundaries the trees can be placed at the marked spots on the chain or wire.

If the ground is at all uneven, this method, of course, would be unsuitable, and the exact locality for each tree must then be marked with a peg, and then by the

Use of a Planting Board

and two small pegs the trees can be placed on the exact spots where the pegs have stood.

The planting board is as illustrated below, and the centre notch is placed around the peg where the tree is to stand. Then place the two small pegs in the notches in the ends of the board. Remove the centre peg and the board, and prepare the hole for the tree. The board is then replaced between the two small pegs, and the tree placed with the stem in the centre notch, and the earth filled in with the tree in that position.

(.....About 6 feet.....)

Firm the tree in gently by starting on the outside of the hole and working into the centre towards the stem of the tree. The tree should be planted so that the former earth line is about on a level with the surface of the ground. This earth line is easily discernible on the tree by the color of the bark.

When finishing, the earth should be heaped around the tree trunk about an inch or so higher than the ground level, and should slope from there to the ground level at the edge of the hole. This for two reasons: The filled-in earth will sink a little after planting. It is very inadvisable to have the surface immediately surrounding the tree in the form of a basin, and so collect the surplus water around the tree stem, allowing the filled-in soil to become sodden.

Cultivation.

Remember the first few years are most important to the young trees, and cultivation is the keynote to successful growth. It is bad business for the grower to neglect trees after having invested his money in them. The planted area should be thoroughly tilled throughout the Summer months, and especially should a good mulch of loose earth be kept around the stems of the trees.

Pruning.

As soon after planting as possible, the young trees should be pruned, cutting out the centres to give an open tree, leaving four or five leaders, cutting these back to within a few inches of the stem, and cutting to an outside eye in every instance. It is bad practice to prune trees prior to planting, as there is grave danger of damaging the terminal eyes on the leaders, which results in a crooked start for the injured limb.

Citrus Trees Bud Selected

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Cross Pollination.

It is now a well-established fact that the cropping qualities of certain varieties of fruit trees are greatly improved by cross-pollination, and consequently it has become a matter of great importance to orchardists to plant varieties that bloom at the same time in close proximity to one another.

Not only do better crops prevail amongst orchards which are subjected to this treatment, but the number of wind-falls is reduced to a minimum, as properly fertilised fruits do not fall to anything like the extent that do partially fertile ones.

The benefits of cross pollination are especially noticeable in Apples, Pears, and European Plums.

Number of Plants or Trees on an Acre

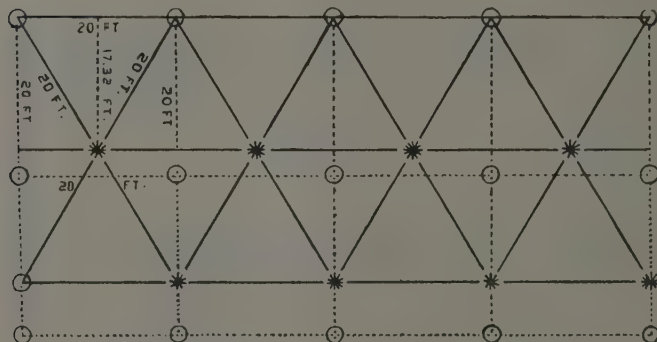
Distances Apart.		Equilateral	
Distance apart each way.	No. of Plants	Square Method.	Triangle. Method.
10 ft.	435	502	
12 "	302	348	
14 "	222	256	
15 "	193	222	
16 "	170	196	
18 "	134	154	
20 "	109	125	
25 "	69	79	
30 "	48	55	
35 "	35	40	
40 "	27	31	
1 "	43,560	50,300	
2 "	10,890	12,875	
3 "	4,840	5,889	
4 "	2,722	3,143	
5 "	1,742	2,011	
6 "	1,210	1,397	
7 "	888	1,025	
8 "	680	785	
9 "	537	620	

Rule Square Method.—Multiply the distance in feet between the rows by the distance the plants are apart in the rows, and the product will be the number of square feet for each plant or hill; which, divided into the number of feet in an acre (43,650), will give the number of plants or trees to the acre.

Rule Equilateral Method.—Divide the number required to the acre "square method" by the decimal 866. The result will be the number to the acre by this method.

The percentage of the different varieties of canned fruits supplied by Empire countries to Great Britain in 1935 were as follows:—Pineapples, 92 per cent.; Plums, 81 per cent.; Apricots, 33 per cent.; Peaches, 29 per cent.; Pears, 27 per cent.; Berries, 17 per cent.; and other sorts 4 per cent., or a percentage of 39 for Empire fruit in relation to total imports.

Of the total of 184,600 tons of canned and bottled fruits imported into Britain in 1935, U.S.A. easily provided the greatest proportion, with 104,750 tons, British Malaya came next (mostly Pineapples), with 40,500 tons, then Australia, with 23,150 tons, and Canada, with 5,850 tons.



The illustration herewith depicts the Rule Square and Rule Equilateral Methods of Planting Fruit Trees as described above.

(Republished by courtesy of C. J. Goodman's Centenary Fruit Tree Catalogue.)



Apples, Apricots,
Almonds,
Cherries, Figs,
Nectarines,
Peaches, Plums,
Prunes, Damsons,
Pears, Loquats,
Quinces, Oranges,
Lemons,
Mandarins,
Grape Fruit,
Persimmons,
Vines, etc.

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Green Manuring of . . . Orchards

Choose Leguminous Crops

Quantity of Seed to Sow per Acre

The objectives sought in the green manuring of orchards, according to Messrs. C. G. Savage and H. Broadfoot in the N.S.W. Agricultural Gazette, may be briefly summarised as:—

(1) To conserve soil moisture; (2) to improve soil fertility; (3) to supply food and energy to soil bacteria; (4) to prevent or reduce soil erosion, and (5) to act as de-watering plants.

For the purpose of green manuring the choice is between leguminous and non-leguminous plants. The more favored are the former, for the simple reason that bacteria, living on their roots, obtain nitrogen from the atmosphere and with it enrich the soil. For green manuring the legumes generally planted include field Peas, Tick or Horse Beans, Clovers, Lupins, and Vetches. During Summer the Cow Pea is sometimes grown, but owing to the light Summer rainfall usually experienced in many parts of New South Wales, green manuring during Summer months is not recommended.

Choose Leguminous Crops.

Barley, Rye, Oats and Wheat are the principal non-leguminous crops grown for green manuring purposes, but they cannot be so strongly recommended as legumes, for the simple reason that the former tend to deplete the soil of its nitrogen content, whilst the latter, by means of bacteria, gain nitrogen from the atmosphere and fix it in the soil. The great importance of this is at once recognised when one reflects that nitrogen is an essential plant food.

When non-leguminous plants are turned under, the organic matter is broken down into humus by soil bacteria, which, needing nitrogen, use that which is in the soil. If, therefore, non-leguminous crops are grown for green manure, growers should apply to the soil a nitrogenous fertiliser, such as sulphate of ammonia or nitrate of soda, during Spring or early Summer months.

Value of Green Manuring.

Some of the advantages of incorporating organic matter in the soil by means of turning under green manure crops are as follows:—

(1) Organic matter is capable of improving both clayey and sandy soils. In the former case it improves the mechanical condition of the soil, makes it easy to work, and increases its moisture capacity. In sandy soils the presence of organic matter tends to bind the soil particles together, thereby lessening loss of soil by erosion, and, as in the case of clayey soils, it increases the moisture-holding capacity of sandy soils. This advantage is very great in parts of the State in which Summer rain is scanty.

(2) Decaying organic matter in the soil gives off carbon dioxide, which is an agent in soil decomposition and assists in making dormant plant food available to the living plant.

(3) The organic matter in the soil provides food for helpful soil bacteria which aid in fixing nitrogen in the soil and also bring it into a condition in which it can be used for plant growth.

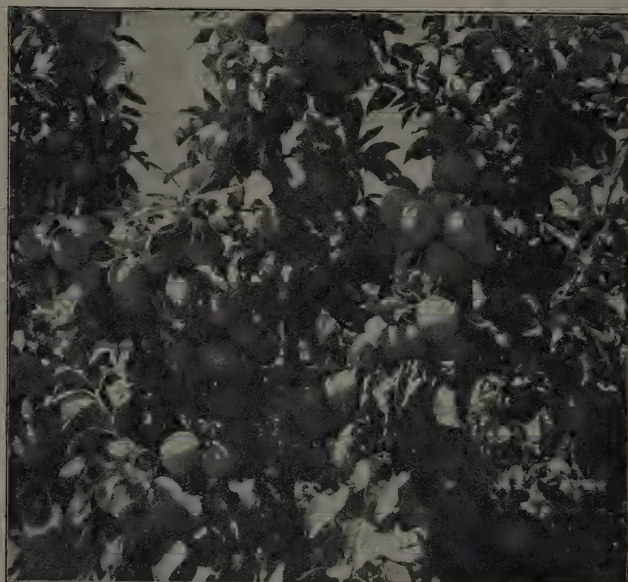


Tick Beans in a Shepparton (Vic.) orchard.

Ploughing in a row of Tick Beans.

The same row after ploughing.

A Happy *and* Healthy New Year



The use of a fertiliser that is rich in minerals is a certain method of increasing the food-value of the fruit that is grown. This helps to raise the standard of NATIONAL HEALTH for it is a simple, straightforward truth that there is a definite relation between health and soil treatment.

The crisp, sweet HEALTH-LADEN Apples shown in the illustration were grown on a W.A. orchard that uses 15 lbs. per tree of "Special K" — a fertiliser containing 10% pure POTASH.

USE A BALANCED FERTILISER. "2:2:1" or "Special K" or any other mixture containing at least 10% Potash with adequate Nitrogen and Phosphoric Acid will, when combined with proper orchard management assure the production of large crops of high-quality HEALTH-LADEN Fruit.

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CITRUS. 8-10 lbs. twice yearly.

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(4) That the moisture-holding capacity may be increased by green manuring has already been pointed out. The converse is also true, and a green manure crop can be used as a de-watering agent. It is therefore of great importance to see that the crop is ploughed in before the soil begins to dry out rapidly in Spring. It is decidedly inadvisable to grow green manure crops in Summer.

To Use Up Surplus Moisture.

It is a well-known fact, easily demonstrated, that water obtained by a plant from the soil is transpired through the leaves. This loss of soil moisture by transpiration may be turned to good account if used, to relieve the soil of surplus moisture, especially in localities where, during the Winter, the soil may have become waterlogged, and on irrigation areas, where a free water table may have developed owing to very copious applications of water in Summer.

If Autumn and Winter rains are very heavy the water table may rise to such a height that it dangerously invades the root zone. It is an ascertained fact that citrus and stone fruit trees have been ruined in this way.

In the drier fruit areas, where there are no irrigation facilities and where Autumn and Spring are likely to be dry, the growing of satisfactory green manure crops in the orchard may be difficult and may be very harmful to the trees. Humus, however, must be built up in the soil. There is only one way to meet the difficulty; a crop should be grown outside the orchard, cut, spread over the orchard, and ploughed in during the Winter months before a possible Spring drying has set in. The green manure crop should be sown during the late Summer, say during

February or March, so that the plants may make good growth before cold weather acts as a check.

Seed Per Acre.

As for quantity of seed per acre, there is no rigid rule. The quantity of Tick Beans, Field Peas, and Lupins per acre will be from $\frac{3}{4}$ to 1 bushel, but Clovers and Vetches will require from 10 to 20 lb. per acre. A dressing of 2 cwt. superphosphate will encourage growth. It must be kept in mind that in regard to the foregoing the term per acre does not mean per acre of orchard. It means per acre of area sown. It is usual to sow strips between alternate rows of trees or vines one year, and the following year sow the strips between the rows of trees not sown the previous year. If this method is followed, from one-quarter to one-third of the orchard is planted to green crop each season, the proportion depending upon the width sown between the rows of trees.

Just prior to the end of Winter, the crop should be ploughed in, for at that time it is still succulent and the soil is fairly damp. These conditions favor fairly rapid decay. If the ploughing under of the crop is delayed until the plants become fibrous, they will be slow in decaying, and this will cause inconvenience to cultivation in Summer, and, in addition, the soil will be left in a very open condition, thus hastening drying out as the days become warmer.

It is sometimes advisable to plough the crop in while it is still short rather than to delay ploughing until late Spring, in order to obtain a greater mass of greenstuff. Unfavorable growing condition during Autumn and early Winter will indicate the advisability of this course.

Lime and Its Application to Orchards, Pastures, etc.

ALL kinds of soil, more or less, whether arable or pasture, need lime, which is said to be one of the essentials to good husbandry. Failure in cropping and poverty-stricken pastures are almost entirely due to the absence of lime in the soil. The longer the renewal of lime is delayed the greater becomes the deterioration of the soil, and the more difficult does it become to grow good crops or maintain pastures at a profitable standard. With regard to the use of lime some discrimination must be exercised, and the practice of liming must not be abused, for it is an old saying that "much lime and no manure will make both farm and farmer poor." But the converse is equally true, and too much manure and no lime has precisely the same effect in course of time as much lime and no manure. The great point in liming is neither to use it too liberally nor yet too scantily and, above all, to apply it at a seasonable time.

In considering the part played by lime in agricultural operations it should be remembered that it works in the soil in two perfectly distinct and separate ways. First of all it acts as manure by giving necessary calcareous food directly to the plant, and, secondly, by supplying food indirectly to the plant either by opening out the store of plant food already existing in the soil or by converting useless or deleterious ingredients into substances useful to vegetation. As is well known, lime is required directly by all cultivated plants as food, and, therefore, any soil totally devoid of lime is barren. Such instances, however, are extremely rare, and there are scarcely any soils the infertility of which can be attributed wholly to the ab-

sence of lime. Either by supplying food to the crop indirectly, or by destroying some noxious constituent, that already exists in the soil, the lime acts beneficially in almost every case. The action of lime sets free potash and nitrogen, both highly indispensable plant food, so that they become available as such. These substances are not contributed to the soil by lime, but are merely changed by its action into a condition in which they are available to plants as food. Then, again, lime is of great value in destroying substances that are harmful to vegetation, such as certain acids which are the cause of sourness. Many soils become absolutely infertile in consequence of the presence of these poisonous substances.

It is well to consider how the abuse of lime may act prejudicially. There is an old idea that lime is a very exhausting substance, and that its continual use, to a great extent, must sooner or later greatly impoverish the soil or render it infertile, but this is only true in a certain sense. Soil may, of course, be overlimed, but it is extremely improbable, although not impossible, and the immediate effect would be to cause a great diminution in the amount of the organic constituents, thereby rendering grain crops uncertain. At the same time it is impossible to destroy the natural constituents of a soil such as potash or phosphoric acid, and lime may be applied as freely as desired so long as these are not removed by injudicious cropping. Provided this is avoided there is no danger of exhausting the material food elements by the application of whatever lime may be deemed necessary. The princi-

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★ ITS ANALYSIS—2:2:1 Mixture contains:

8¼% NITROGEN (as Sulphate of Ammonia).

8¾% PHOSPHORIC ACID.

10% POTASH.

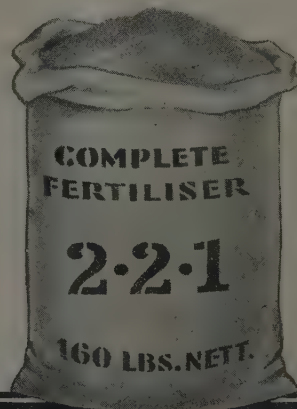
GIVES BALANCE—Because 2:2:1 Mixture is so well balanced it gives greatest profit in terms of **highest yield of best quality** fruit.

AND ECONOMY—2:2:1 means more plant food in every bag. Compare its price and analysis with any other orchard fertiliser. . . .

ALL FERTILISER DEALERS sell 2:2:1 for Spring application to Fruit, Vegetable and Garden Crops because it's so—

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pal evil to be guarded against from overliming is too great a destruction of organic matter, which renders the soil unsuitable for the growth of corn crops.

Lime produces a marked effect on newly ploughed land, and on peaty soils or land rich in organic remains. It should never be allowed to come in contact with any manure at all, and these two substances ought always to be applied at different times. Years ago, when the knowledge regarding the various substances were limited among farmers, it was often the custom to mix farmyard manure and lime together, thus neutralising the good effect of both. Lime is best applied to land that has been manured the previous year, or if the manure has been ploughed under in Winter or early Spring a free dressing of lime may be given in the Autumn following.

It is an excellent plan to give a dressing of lime to any land intended to be sown with lucerne or clover. Its application is practically certain to ensure a good stand, and also, it may be applied advantageously to a bare fallow in Autumn in preparation for a wheat crop. On a great many pastures lime is needed just as badly as on arable land, and occasional dressings have a good effect in sweetening and improving the herbage. Its use encourages the growth of clovers, which become strong enough in course of time to smother weeds and worthless grasses. The effect of lime on newly sown down pasture is striking, but it is seldom applied these days. Better facilities should be afforded farmers to obtain lime at a reasonable price, and railway freights on such an important element of fertility should be reduced.

The Selection of Fertilisers for the Orchard and Garden

Wiser Discrimination Amongst Growers. ∴ The Role of Nitrogen.

By R. A. Boyle, M.Sc.

TO ONE INTERESTED in the subject of manuring, who moves about amongst fruit and vegetable growers to-day, it is most pleasing to note the growing appreciation of the value of separate ingredients or plant foods in the fertilisers that are applied. It is but one instance of the steps these growers are taking to improve their production of ever increasing quantities of quality products.

Progress has been slow in this direction, largely because a clearer understanding depends upon a certain amount of scientific training. Facts like these, for example, have taken time to penetrate:—

That one plant food, like phosphoric acid, cannot make up for a shortage of another; that a few cwt. per acre of any fertiliser, whether it be called artificial, chemical, or even organic, cannot be regarded as of any appreciable value where the supply of humus giving material is concerned; that a fertiliser cannot both last in the soil and supply the requirements of a tree or plant that demands a burst of feed over a short period; that it is the balance that exists in the soil between all the plant food requirements that matters; that the cost of a fertiliser depends almost entirely upon the percentage contents of its ingredients, and so on.

Nevertheless, thanks to the activities of advisory services like the Departments of Horticulture in each State, to the inclusion of agricultural science as a subject in rural schools, and to a freer exchange of thought and ideas amongst growers themselves, a much more enlightened outlook upon soil treatment is evident to-day.

Nitrogen an Essential For Intense Culture.

From the nature of his crop and its cultivation, an orchardist or gardener must specialise in the appreciation of nitrogen in all its forms and their costs. In this regard Australia is no different from any other country, as a search of the world's literature on the subject will reveal. Nitrogen, of all the plant foods, is the most likely to be deficient under intensive systems of culture like that in

an orchard or garden. If the application of some form of nitrogen at the right time does not benefit a crop, then the grower is indeed fortunate. On the other hand, if nitrogen is deficient, and no application is made, then the crop must rapidly deteriorate. Extreme cases of nitrogen starvation are surely familiar to all; yellow leaves and growth cessation, bringing, of course, in their train, less and less crop. Feed a tree exhibiting these symptoms with sulphate of ammonia alone for a year or two, and in 9 cases out of 10 a productive tree will result.

Of course, trees do not exhibit these symptoms all at once, and by the time they did it is pretty certain that their owner would not be depending upon them for a living. To the trained eye and keen observer, much earlier indications of a nitrogen deficiency than these would become apparent. They would either be remedied there and then or, better still, never permitted to occur. The early effects of a shortage of Nitrogen in the soil are so detrimental to profitable production that they are sufficient to mean all the difference between profit and loss, under present economic conditions. Arguments may be permitted as to how that shortage should be made good—what forms of Nitrogen should be applied, but the neglect to take any steps to do so is inexcusable. No grower of fruit or vegetables, then, can afford to miss any advantages which an adequate supply of Nitrogen might provide. Moreover, it is not difficult to make reasonably sure of this. Nitrogen, unlike Phosphate of Potash, not only manifests its deficiency by unmistakable symptoms, but it also registers a sufficiency, if not an excess, by promoting vigorous growth and dark green leaves—healthy if sufficient, unhealthy when in excess. It is so easy to supply a few lbs. per tree or 1 cwt. or so per acre of sulphate of ammonia in order to supply this Nitrogen that before imagining any other possible cause of a falling off in production, it is wisest to suspect a shortage of Nitrogen.

Nitrogen is supplied in several forms. A certain amount may be derived from leguminous cover crops, where these can be conveniently and successfully grown.

More often, however, it must be supplied in what might be termed an artificial manner, i. e., by means of a fertiliser. For a number of reasons, which cannot be explained in a brief space, the available Nitrogen from any source does not remain in the surface soil or feeding zone for much longer than one year. Consequently, the need for annual application arises.

Most orchardists and gardeners, then, should be "in the market" each year for nitrogen. For fruit trees the time of application is generally the early Spring, whilst for garden crops two applications are usually advisable.

Here are some of the questions which should arise in a buyer's mind when purchasing his requirements in the shape of any fertiliser on offer:—

How much nitrogen does the fertiliser contain?

What percentage of the other plant food ingredients, if any, are present?

How soon can the crop get the nitrogen?

How much does the fertiliser cost?

Suppose that a crop is considered to require 2 cwt. of sulphate of ammonia per annum to maintain satisfactory vigor and production. The answer to the first question above enables the grower to calculate what quantity he will need to supply the equivalent of 2 cwt. of sulphate of ammonia, containing 20 per cent. of nitrogen. If, for example, the mixture contains 5 per cent. of nitrogen, then 8 cwt. per acre would be necessary. Next, knowing the percentage contents of the other plant foods in the mixture, it is fairly simple to calculate what equivalent, of, say, super, and sulphate of potash would be supplied by 8 cwt. per acre. These may be unnecessarily high or too low. Then, as fertilisers are applied to feed the plant and not so much to better the physical condition of the

soil, the availability of the plant foods in the mixture is an important point. Finally, of course, the cost is often a deciding factor, especially that of the nitrogen. In this regard again, sulphate of ammonia serves as an ideal basis for comparison.

It will be found that the prosperity of orchardists and gardeners will depend very largely upon the skill which they exercise in the purchase and application of nitrogen.

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Some Aspects of Artificial Fertilisers and Soil Acidity

(Contributed.)

SOIL ACIDITY may be due to an insufficiency of lime in the original soil-forming material, or it may develop owing to loss of lime by plant absorption, leaching, or the use of acid-forming fertilisers. The influence of modern fertilisers on soil reaction is an important consideration, and has recently received considerable attention from agricultural investigators in various parts of the world.

In a recent address given by Dr. H. H. Zimmerley, Director of the Virginia Truck Experiment Station, U.S.A., to the National Fertiliser Association, and published in the *American Fertiliser*, Vol. 85, No. 4, August 22, 1936, it is stated that one of the most important innovations in the fertiliser industry during the past few years has been the production of non-acid forming mixed fertilisers. Dr. Zimmerley states that only those who have followed closely the effects of acid-forming fertilisers over a period of time can fully realise their detrimental effects. In many lightly buffered soils the use of such fertilisers has caused a striking increase in soil acidity, and when used over a period of five years, without any application of lime, fairly productive soils may readily become unproductive and unsuitable even for the growth of acid-tolerant crops like Potatoes. It is further stated that conditions associated with excessive soil acidity are probably injurious to practically all our food and forage crops.

It is pointed out that under acid conditions certain plant foods may be rendered unavailable. Plants may suffer from lack of magnesium or calcium, and the proper calcium-potassium balance may be disturbed. Moreover, the rate of phosphorous fixation is greatly accelerated and much of the phosphoric acid applied to strongly acid soils is rendered unavailable to the plant in a relatively short period of time.

In addition to the ultimate effects on soil and plant growth which the continuous use of acid fertilisers produce, it has been found that a marked deleterious effect is often produced in the actual crop to which such fertilisers are applied, and many fields of Beet, Spinach and other acid-sensitive crops have been completely ruined by one application of acid-forming fertilisers.

In 1934 the American Society of Agronomy appointed a special sub-committee to conduct experiments on the neutralisation of acid fertilisers by the admixture of limestone of varying degrees of fineness. It was found that limestone coarser than 40 mesh had very little effect in reducing acidity during the period in which the crop was grown. Forty to sixty mesh material was slightly more effective, whilst limestone of 80 to 100 mesh was much more satisfactory. It was found, also that basing down the limestone with the fertiliser gave more effective results than where the mixing was done just prior to application.

In addition to testing the effect of various limestone fertiliser mixtures on soil reaction, observations were made on the manner in which certain crops responded to applications of these mixtures. Under the conditions of the

experiment, Spinach and collards made practically no growth on the soils treated with acid-forming fertiliser, or with such fertiliser to which rock phosphate or limestone coarser than 20 mesh had been added. Twenty to sixty mesh limestone gave relatively poor growth, as compared to that produced where 80 to 100 mesh limestone had been used as the neutralising agent. Even sorghum, which is generally considered to be fairly resistant to acid soil conditions, showed a marked growth response to the finely ground limestone.

In concluding his remarks on this aspect of modern fertiliser treatment, Dr. Zimmerley states that it is gratifying to know that in several of the American States regulations have been adopted which require a guarantee of acidity or basicity for all fertiliser mixtures. It is further stated that the general adoption of such guarantees by the fertiliser industry would be of considerable value to growers in enabling them to maintain their soil at the correct degree of acidity for the production of various crops.

The deleterious effects liable to be caused by the constant use of acid-forming fertilisers are of considerable importance to orchardists and market gardeners, as under Australian conditions it is in these classes of primary production that the heaviest and most regular applications of artificial fertilisers are usually given.

It must be remembered, also, that many of our soils in the higher rainfall areas are naturally moderately to strong acid in reaction, and normally require periodic liming in order to prevent loss of fertility, and obviously increasing quantities of lime will be necessary to neutralise the additional acidity arising from the use of acid-forming fertilisers.

It is well known that the profitable production of many fruit and vegetable crops depends very largely on the amount of available nitrogen in the soil, and consequently nitrogenous fertilisers are now widely used by orchardists and market gardeners. It is of particular interest, therefore, to know that the nitrogenous fertilisers at present on the market include both non-acid and acid-forming types. In this connection an article published in the *Journal of the Ministry of Agriculture, England* (December, 1935), by Professor J. A. Scott Watson, Professor of Rural Economy at the University of Oxford, will be of particular interest to Australian growers.

Professor Scott Watson emphasises the fact that due consideration is not always given to the effect which the various nitrogenous fertilisers exert on the lime content of the soil.

It is worthy of note that 1 ton Chilean granulated nitrate of soda conserves 5 cwt. of lime, and decreases the lime bill by 10/-.

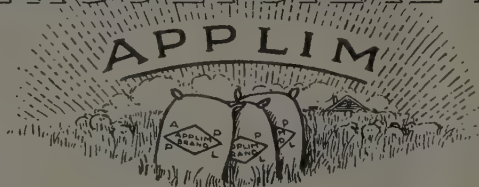
In conclusion, Professor Scott Watson points out that when calculating the cost per unit of nitrogen in the various nitrogenous fertilisers, an allowance should be made for the effect which the fertiliser will have on the farmers' lime bill.



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NORTHMEAD, N.S.W.

Soil Starvation

SOIL erosion, with the attendant troubles it brings, has received much attention recently. That this is long overdue has been the opinion of experienced observers for many years. The increasing denudation of the hills, the large number of disastrous floods with the loads of silt deposited afterwards and the moving, changing landscape one finds out in the plain country, all force the problem into prominence.

The orchardist and viticulturist, however, are slow to realise that the same processes, with modifications, are going on in the most intensively settled areas. Not only in the paddocks and on the hills, but in the orchards themselves.

Soil starvation makes itself felt in a number of ways depending on climate, crop, vigor of trees, etc., but in the end the general symptoms are the same. A soil which has been well fed and whose supply of available plant food is high, will readily react to treatment and grow practically any crop well. The useful water holding capacity of the soil is large and drainage troubles do not appear very frequently. The trees, vines or what you will, grow rapidly and do well, and the wood is matured and sound and produces large crops of high quality.

In this condition is the average "virgin soil" and most farmers appear to think it unattainable after the land has been under the plough for a few years. That this is so is largely their own fault as a brief resumé of the soil conditions will show. Available plant food supply depends on the capacity of the soil to meet the demands made on it by the crop. Now no soil is rich enough to meet this demand indefinitely under modern conditions. Fertilisers must be added to keep up the supply, and it must contain all the ingredients used by the crop in large amount. Under Australian conditions the plant food most frequently neglected is potash. The phosphoric acid and nitrogen supply is generally reasonably well looked after, but many growers appear to think that the potash supply will be supplemented by a beneficent Providence. The addition of potash to the fertiliser may not show startling results on healthy trees, but as insurance against this form of soil starvation it is essential.

Soils poor in available plant food generally induce alternate cropping, poor setting and fruit of low quality, bad keepers, low sugar content and the like. A casual glance in your mind's eye over the orchards in your district will illustrate this.

An orchard or vineyard which is not cultivated or worked in any way will frequently not show these troubles on the very small crop produced. But as soon as cultivation is taken in hand and the trees are encouraged to grow and produce crops, the necessary plant food is found to be wanting. Thus it is necessary to adequately feed an orchard that is being improved even though the crops taken from it under the unimproved conditions were fair quality.

Clean cultivation has often been praised as a method of keeping down weeds, saving loss of water by evaporation, and so on. All very true, and yet clean cultivation has probably caused as much harm, or more, than any other farming practice in Australia. The water holding capacity of a soil, its physical condition, its power to support beneficial bacteria and so on, depend to a large extent on the humus supply. Humus is decaying vegetable and animal matter and actually slowly burns up or oxi-

The Importance of Green Manuring and Complete Fertilising

★ By David H. Case, B.Sc. Agr.

disin the soil. This oxidation is materially hastened by heat. Now, any cultivated soil in Summer gets uncomfortably hot, and the humus burns out of this at a terrific rate. Figures have been obtained putting the loss at 3 per cent. per annum in the top six inches of soil. Most virgin soils have a humus content of 4 to 5 per cent. As it is burnt out, of course the rate of loss decreases, but every orchardist knows how fast a soil can lose the texture and water holding power it had when it was first ploughed.

The remedy lies in consistent and steady green cropping from the time the soil is broken up. The green crops do much better in the virgin soil, and it is relatively easy to keep the humus content at a high level. Thus the soil can hold more water and offer more available plant food to the tree. A soil that is bare of humus will frequently give disappointing results when fertiliser is applied as the tree cannot obtain the food in an available form. A soil under bad conditions frequently acts on the plant food added, particularly the potash, and renders it insoluble and lost to the tree or vine. Under good conditions the humus holds water which contains a fair amount of dissolved plant food. This acts as a sort of buffer between the insoluble plant food and the applied soluble fertiliser and makes the fertiliser available more immediately to the tree.

The classic example, which is worth following, of not letting a soil approach starvation comes from Queensland. The Tully sugar cane area has fairly poor acid gravel soils which normally give excellent crops for a few years and then fade out. Under supervision of the Sugar Bureau, farmers in that area, by green manuring and complete fertilising have succeeded in heating the virgin soil yields time and again, thus demonstrating that a virgin soil can be improved on.

This is worth while remembering and following up, especially as green cropping is more easily done when the trees are small and only a relatively small amount of fertiliser is necessary. If it is followed up, alternate cropping will not be a bugbear and the fruit will steadily improve in quantity and quality.

There is only one drawback to this policy. In thirty years time you will not be able to say: "The place was better in 1937 than now. Things are not what they were." Because the place will actually have improved.

AUSTRALIAN PACKERS WIN AWARDS.

At the Imperial Fruit Show, held in Liverpool during November, a Victorian packing house (Ardmona Fruit Products Co-operative Co. Ltd.), won seven first prize awards, three seconds and two thirds. Kyabram Co-operative Fruit Preserving Co. Ltd. won two firsts, three seconds and three thirds. Henry Jones Co-operative Ltd. obtained two firsts, two seconds and two thirds. Shepparton Fruit Preserving Co. Pty. Ltd. won one first and one second, whilst Australian Preserves Pty. were awarded two thirds.

Shantung, Northern China, is fast developing its fruit industry. With Chefoo as the chief centre and from trees originally imported from California, 8,000 tons of fruit were shipped to the major markets in the Orient in 1936. Pears, Apples, Cherries and Grapes are the main varieties.

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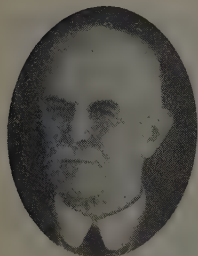
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Export Control Board.

... The ...

Canned Fruit Industry



Mr. W. J. Adams,
Secty., Canned Fruits
Export Control Board.

Production Statistics

Review of 1936 Exports ∴ Future Prospects

"THIS REPORT records another successful year for the canned fruits industry. The close of the 1935 season saw only a nominal carryover in the hands of the canners. The 1936 packs of Apricots and Pears were the highest on record, whilst that of Peaches, although showing a figure lower than the record pack of 1933, was well above the average output.

"Exports during 1935 were not as high in quantity as those of 1934, but they represented all that Australia had to offer. The adverse conditions in the United Kingdom market during 1936, caused by the heavy volume from U.S.A., were satisfactorily met, and we anticipate that the carryover will not be unwieldy."

Thus Dr. Earle Page, Minister of State for Commerce, wrote in a foreword to the 10th annual report of the Canned Fruits Control Board, and says in a few words that the position of the canned fruits industry during 1936 was most satisfactory.

Production Statistics.

As illustrating the value to the Commonwealth of the fruit industry it is worthy of notice that, according to the latest statistical information available (taken from Production Bulletin No. 29 issued by the Commonwealth Bureau of Statistics), the area under fruit culture in all States is 277,762 acres. Of all varieties, Apples represent the largest acreage with 83,048 acres in bearing, followed by citrus fruits of all varieties with 42,037 acres, and Bananas with 19,305 acres.

Of the three main varieties most interesting to the canning industry, Peaches require 17,942 acres, Pears 17,434 acres, and Apricots 10,165 acres, so that from the point of view of definite primary production, the canned fruits which we are now considering represents an industry employing many thousands of people and representing the product of 45,541 acres of the best land in the Commonwealth in present bearing and 9,384 acres not yet bearing fruit.

A further interesting study shows that taking the same three varieties, Victoria employs 22,124 acres, N.S.W. 10,128 acres, S.A. 6,123 acres, Tasmania 3,392 acres, W.A. 2,050 acres, and Queensland 1,710 acres in bearing to produce the above quantities.

The actual quantities of fruit, represented in bushels, produced from the above three varieties, during the 1935 season, are statistically recorded as from all States as: Apricots, 957,066; Peaches, 2,011,542, and Pears 1,934,975, of which Victoria and N.S.W., as the two chief producing States provide 2,454,972 and 1,022,968 bushels respectively. The production, per acre, averaging all States, was as follows: Apricots 94.15 bushels; Peaches 112.11 bushels, and Pears 110.99 bushels.

Taking each State separately, the highest average yields recorded per acre were: Apricots, S.A. with 124.81 bushels;

Peaches, S.A. with 127.07 bushels, and Pears, Tasmania with 138.82 bushels.

Before leaving our comparative statistical study, it is noted that in all three varieties, the area under bearing has dropped slightly for Apricots and Peaches, whilst Pears show a slight increased acreage. Taking the past three years, with 1929 as a comparison, the acreage bearing fruit was recorded as:—

	1929.	1933.	1934.	1935.
	Acres.	Acres.	Acres.	Acres.
Apricots	11,635	10,342	10,305	10,165
Peaches	20,301	18,488	18,373	17,942
Pears	17,988	17,538	17,353	17,434

Statistics, though dry reading to some people, are in reality the best means by which a comparative analysis of production can be conveyed, and they do show, with an exactness which cannot be otherwise visualised, how the production fluctuates from year to year, dependent upon natural and economic conditions, hence their inclusion in a study of the canned section of the fruit industry.

1936 Packs.

The report issued by the Canned Fruits Control Board quotes the Apricot pack for the 1936 season as the largest on record, being 379,435 cases, exceeding that of 1935 by 105,075 cases. The Peach pack declined to 1,033,607 cases or 67,829 cases less than 1935. Pears created another record, and canneries packed 808,387 cases, which exceeded 1935 by 308,624 cases.

Favored by ideal climatic conditions during the growing and harvesting periods, heavy yields were experienced, and offerings to the canneries were consequently greater, in the aggregate, than any previous year in the history of the industry. Approximately 45,000 tons of fresh fruit were used for canning in addition to a representative quantity processed into fruit pulp or jam.

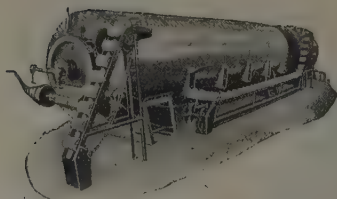
Taking the aggregate pack in the three varieties, the 2,221,429 cases created a record in production, displacing the previous best year, 1933, when 2,039,679 cases were processed.

Export.

In 1934 Australia opened up new markets in Canada and New Zealand. Fortunately, these have been maintained and developed, assisting materially in clearing available stocks. The heavy increase in production in this past season, however, will necessitate an export sale of 1½ million cases to close off the 1936 season and avoid a heavy carryover. Up till June last over one million cases had been sold, and the Board expects the season to close satisfactorily.

Prices were maintained at 1935 figures, except that 30 oz. Peaches had to be reduced in competition with Californian offerings, a matter of 4½d. per dozen.

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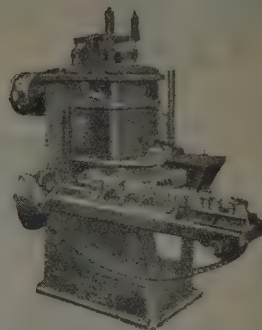
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The following is a table of exports of canned fruits showing the past two full years since the million-mark was first passed, with 1926 as a comparison and 1936 as for 10 months to October 31. The figures represent cases containing each 2 doz. 30 oz. tins (or equivalent).

Destination.	1926.	1934.	1935. (10 mths.)	1936
United Kingdom	190,423	1,211,474	1,032,554	1,845,651
New Zealand ..	81,260	50,126	51,153	60,449
Canada	8,294	45,159	68,109	217,596
The East	12,153	18,232	16,598	31,768
Miscellaneous ..	3,533	3,023	2,851	7,542
Total	295,663	1,328,014	1,171,265	2,163,006

As illustrating how Empire-grown canned fruits are increasing in the supplies sent to Great Britain by all producing countries, the following table indicates a steady rise. The figures are expressed in percentages of the total imports into the United Kingdom from all sources:—

	1932.	1933.	1934.	1935.
	%	%	%	%
From foreign countries .. .	83.4	77.2	67.04	71.44
From Australia	12.3	16.3	26.20	22.07
From other Empire countries	4.3	6.5	6.76	6.49
	100	100	100	100

Trade With Canada.

The consistent rise in exports to Canada that has occurred each year, was again experienced in 1936 with a particularly large acceptance of Australian canned fruits. This was in spite of material development of the canning industry in Canada, which in 1935 produced close on one million cases of canned Apricots, Peaches and Pears, a 50 per cent. increase over 1934.

The reduction of 1 cent per lb. duty on U.S.A. canned fruit into Canada is fortunately not enough to greatly disturb Australia's preference, although it makes a slightly greater competition from a price point of view. Unless depreciation of American currency occurs, the Canadian market can be expected to be fairly safe for Australian canned fruits until such time as Canada's increased plantings begin to come into bearing.

To meet Commonwealth representations, Canada has extended duty free entry of Australian canned Pineapples into Canada, whilst retaining the duty of one cent per lb. on British Malayan Pineapples, and it is expected that this market will be correspondingly widened. It is not expected that the prevailing duty of four cents per lb. on Hawaiian Pineapples will be disturbed.

New Zealand Trade.

As will be seen from the above table, New Zealand's acceptance of Australian canned fruits has fluctuated considerably during the past ten years, and has dropped well below the first half of that period. Although slow in the first half of 1936, shipments improved up to September, and it is expected that the total exports for 1936 will approximate those of 1935. The Control Board is continuing its representations to the New Zealand Government in an endeavor to arrive at mutually satisfactory agreement upon several problems that affect our trade with the Dominion.

The East and Miscellaneous.

The decline in exports to Eastern countries, which developed in 1935, has fortunately been remedied in 1936, and following the visit of trade delegations to those countries last October, it is hoped that an extension of trade



Australian Dried and Canned Fruit display in a London shop window.

will result. The same experience applies to miscellaneous ports, whose trade, though comparatively small, supplies a moderate outlet to nearby islands and mandatory subjects.

Pineapples.

The peak year for canned Pineapple exports was 1934, when 106,350 cases were shipped; 1935 dropped to 59,761 cases, and 1936 (up to September 30) recorded 29,041 cases. The Board explains that this drop in exports was not due to loss of interest in overseas markets, but was due to canners' inability to find sufficient supplies owing to the Summer crop being small and the Australian market, being understocked, requiring the majority of the pack.

Local Consumption.

Unfortunately, Australia consumes only about 35 per cent. of her own canned fruits, the balance having to be exported overseas. Yet it is gratifying to know that, except in 1934, home consumption has been steadily increasing and the educational programme which aims to popularise canned fruits in the regular menu, is undoubtedly bringing some response. The domestic consumption for the last five years is recorded as: 1931, 624,115 cases; 1932, 443,998; 1933, 634,374; 1934, 853,928, and 1935, 693,054 cases.

Fruit Salad.

This section of the canning industry is of comparatively recent origin, and offers an outlet for the utilisation of other fruit mixtures not exclusively covered by the three main varieties. Up to date the movement has not been great, but a fair market has been opened up with Canada, preliminary introductions have been made into New Zealand and overseas trade is slowly developing.

For the nine months ended September, 1936, Canada took 6,520 dozens of Australian canned fruit salad; the East received 1,704 dozens; miscellaneous is recorded as 60 dozens; 34 dozens went to New Zealand, and none to the United Kingdom, making a total shipment overseas of 4,159 cases each 2 dozen 30 oz. tins, or equivalent. There are possibilities of relatively large developments in this section of the trade.

Sugar Concession to Continue.

The Sugar Agreement Act, 1935, provides for the continuation of the Fruit Industry Sugar Concession Committee for a further period of five years. This committee fixes minimum prices at the beginning of each canning

season, which canners are required to pay for supplies of fresh fruit. The operations of the Committee have been of value to growers in the past, and its continuance is therefore expected to reflect a measure of protection to the canning industry during the coming years.

Up to August, 1936, disbursements made included: Domestic sugar rebate £71,347, being an increase of £8,732 over 1935; export sugar rebates, £78,627, an increase of £16,027, and export assistance £58,789, representing a decline of £46,295. A renewal of the Sugar Agreement has increased the Committee's revenue from £200,000 to £216,000 per year, as from 1936.

Research.

The investigations of the Oriental Peach moth problem in Victoria were continued, and a more intensive study is planned in a two-year programme to be conducted. This will follow the general lines of studies in the life history of the pest, control by sprays, orchard control, and biological control. Experiments with nicotine sprays will be continued, supplemented by laboratory tests, field supervision and the introduction of parasite liberation and breeding. Consignments of parasites from U.S.A. will be obtained, and further reports prepared for the guidance of orchardists.

The increase of revenue from the sugar industry, with authority for part of the funds to be expended on scientific and industrial research will enable efforts to be continued to increase the yield per acre of fresh fruit required for processing. It is proposed, during the coming year to conduct research work related to all main canning fruits.

Personnel of Control Board.

Intimately related to the fortunes of the canning industry, the Canned Fruits Control Board is primarily responsible for the orderly marketing of the export portion of the Australian pack. The personnel of the Board during 1936 was disturbed by the death of the late Sir James Cooper, London representative, but otherwise the Board comprised the same members as last year. They are:—

Sir Charles Merrett, C.B.E., V.D., Chairman and representative of the Commonwealth Government.

Mr. G. J. Evatt, representing State-controlled canneries.

Mr. A. W. Fairley, representing Co-operative canneries.

Mr. T. L. Stafford, representing proprietary and privately owned canneries.

Mr. B. Flewell-Smith, representing Pineapple canneries.

The Right Hon. Lord Strathearn, P.C., K.C., representative in London.

Mr. W. B. Cooper, Secretary in London.

Mr. W. J. Adams, Secretary of Board, 419 Collins-street, Melbourne.

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Lackersteen & Co. Ltd., 2 Parramatta-road, Camperdown.

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Pick-Me-Up Condiment Co. Ltd., Alice-street, Newtown.

Rosella Preserving and Manfg. Co. Ltd., Morley-avenue, Rosebery.

Sherwood's Jams & Preserves, 6a Isabella-street, Balmain.

Tillock & Co. Ltd., Kent and Liverpool streets, Sydney.

Leeton Co-operative Cannery Ltd., Leeton.

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Associated Jam Packing Co. Pty. Ltd., 42 Meaden-street, South Melbourne.

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E. G. Benton, 303 High-street, St. Kilda.

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Fruit Growers' Preserving Co. Pty. Ltd., 189a Victoria-street, Ballarat.

Holly Preserving Co., 118 Balmain-street, Richmond.

W. H. Johnson Jams Pty. Ltd., 42 Meaden-street, South Melbourne.

Jones, Miller & Co., Williamson-street, Bendigo.

H. M. Leggo & Co. Ltd., Victoria-crescent, Abbotsford.

Francis Longmore & Co. Ltd., 617 Spencer-street, Melbourne.

MacRobertson Pty. Ltd., Argyle-street, Fitzroy.

Mildura Co-operative Fruit Co. Ltd., Mildura.

Passila Passion Fruit Products Ltd., 40 Queen-street, Melbourne.

Rosella Preserving and Manfg. Co. Ltd., Cremorne Gardens, Richmond.

Shepparton Fruit Preserving Co. Ltd., Shepparton.

H. S. K. Ward Pty. Ltd., Spencer-street, Melbourne.

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Robson Jarvis & Co., Hectorville.

Rosella Preserving and Manfg. Co. Ltd., Kent Town.

South Australian Fruitgrowers' Co-operative Society Ltd., Payneham-road, St. Peters.

F. A. James, Victoria-square, Adelaide.

WESTERN AUSTRALIA—

Crystal Jam Co. Ltd., Railway-parade, East Cannington.

George A. McKim (Orchard Peel Co.), Edward-street, Gosnells.

Plaistowe & Co. Ltd., 155 Havelock-street, Leederville.

H. Rayner & Sons Ltd., 90 Railway-parade, West Perth.

Swan Brand Products, 567 Newcastle-street, Perth.

TASMANIA—

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J. G. Turner Pty. Ltd., Morrison-street, Hobart.

Port Huon Fruitgrowers' Co-op. Association Ltd., Davey-street, Hobart.

Exports of Australian and New Zealand Apples and Pears

Interesting Review of the 1936 Season by Messrs. F. W. Moore and Co. Ltd., London :: Prospects for 1937

Reasons for Disappointing Season in 1936 — Nearly 4,000,000 Extra Cases from N. America — Cold and Wet Season in England — Scarcity and High Prices of Vegetables — Lengthened Soft Fruit Season — Longer Voyages via Cape — Some Cargoes Unsatisfactory, Improvement in Packing Appreciated — Pear Prices Payable — Cold Storage in England — Competition from S. Africa and South America — English Market Requirements

THE STORY OF THE 1936 Australasian Apple season in Great Britain is a gloomy one. Taking 1936 as the end of a ten-year period, it added another to the many unsatisfactory and unprofitable seasons experienced by Apple growers in the Antipodes, the unfortunate fact being that during the period 1927-1936 only the 1927, 1929, 1931 and 1935 prices were satisfactory to growers and importers, at the respective ends of a trade which was inaugurated by the Island State of Tasmania—a colony at that time—fifty years ago. The other six years of this decade resulted in heavy and disastrous losses to the producers, as well as in somewhat lesser degree to forward buyers in this country.

The allusion to these six years does not, however, convey a full picture of the adversities the Apple growers have suffered during the period in question, for in Tasmania and some of the Australian States the crops were unusually small in 1929, and small again in 1931, with the result that quite a considerable section of the growers did not share in the benefit of the payable prices—for they were not more than reasonably profitable—which ruled in Britain in those years.

It was in 1902 that the firm of F. W. Moore & Company (it was later registered as a limited company) was set up in London in connection with the Tasmanian Apple trade. During our lengthy experience, the history of the trade, taking any decade or any term of successive years one may select at random or by design, is one of "ups and downs"—the results of one year for the most part were different from the immediately preceding one, or on the other hand, were no reliable forecast of what the English markets held in store for Apples from the same source in the following season. We mean that even succeeding seasons were contradictory.

The year 1936 can, however, of itself, truly be described as a season of "ups and downs," with unfortunately the unfavorable influences predominating. It ranks in the case of Australia as much the same in the matter of average prices as 1934, and in company with that season is the next worst during the ten-year term to that year of disaster, 1933. As regards New Zealand, too, the results of the past season correspond in essential respects to those of 1933, and the average prices in the year 1933 and 1936 have been the worst since the inception of the Dominion's Apple exports to Great Britain in 1920.

The season was not without promise, for following the encouraging prices for Australasian fruit in 1935, the Apple crop in England had been comparatively a failure; there was, substantially speaking, no carry-over of English Apples in gas storage, or at any rate the gas storage stocks were much less than those of twelve months previously; moreover, the "forward" demand was brisk and good for varieties which speculators and merchants are

accustomed to buy from Australia and Tasmania; and also the industrial condition and the general state of export trade in England were known to have improved and be still improving.

Thus, it was that the 1936 Apple season was regarded with a feeling of confidence or at least optimism, at both the shipping and receiving ends—12,000 miles distant. Incidentally it might be mentioned that the shortage in the English crop of Bramley Seedling, which variety finds so much favor for gas storage, was equalised in part by imports of Bramleys from Ireland which went into store here, and were held until as late as June and early July. Even so, the quantity of Bramleys was far short of that of the previous year.

Bigger Deliveries from North America.

Principally on account of the big shortage in the English Apple crop, imports from Canada and the U.S.A. increased considerably, and represented equal to 3,800,000 boxes more than the quantity imported in the year 1934-1935.

There was a much larger carry-over into the Australasian selling season here. More U.S.A. Apples were received during the months April/July than for several years past. Then the prices for South African Apples, which are on the market here a full six weeks ahead of the arrival of the earliest Australians, were disappointing.

Australian Opening Prices.

As was expected under these conditions, the opening prices for Australian, Tasmanian and New Zealand Apples were only moderate. Yet there was an element of steadiness, and they were selling readily enough for the first few weeks of the season, so that all concerned felt that an improvement in prices could be looked for, once the earlier varieties were disposed of and the market became clearer of competing supplies from other sources.

Britain's return to prosperity was being featured regularly in the newspapers, and the fact that practically all classes of workpeople were sharing in the benefit of trade improvement was generally recognised and relied upon to some extent as something which should assist the consumption of fruit. Viewed in the light of the subsequent average prices, those which ruled for the early cargoes were relatively not unsatisfactory. Nevertheless the fact is that at the time the needed improvement was being looked for.

In the second half of April, just when the Australasian arrivals were starting to assume volume, it looked too as if the market would settle down from prices, which, as we have indicated, had been "not altogether unsatisfactory" to what could be regarded as satisfactory values. As an illustration, the prices realised for fruit delivered by the P. & O. mail steamer "Mooltan" may be referred to. The "Mooltan" reached London on April 17, and as in

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other seasons landed her Apple cargo in perfect condition. Our records show that Tasmanian Apples ex that vessel made very good prices, viz.—mainly 11/6-14/3 for Cox; 8/3-10/6 for Cleopatra; 8/3-9/6 for Dunns, Londons and French Crab; 8/-10/3 for Ribston; 8/- - 9/6 for Alfriston; 7/9-9/9 for Jonathan, and 7/9-8/6 for Duke of Clarence—with the satisfactory overall average of 9/4½ per case.

Meanwhile, however, climatic conditions were not favorable to the fruit trade, and, unfortunately, the cold wet and changeable weather lasted right throughout the spring. The summer here also for the most part did not assist the demand for fruit.

A reason which was advanced as contributing to the poor prices for imported Apples was the

High Cost of Vegetables.

The severe Winter conditions in England resulted in a general shortage of green vegetables. The result was that vegetables were selling at extraordinarily high prices, the reaction being that the spending power of householders was seriously curtailed in the matter of fruit purchasing. It has been stated that in the industrial areas particularly, where the spending power is limited, the necessity for including vegetables of some kind in the household's dietary meant that of the weekly budget the amount which could be set aside for fruit was unusually small, whereas normally, in those areas there is at least as much money spent on fruit as on green vegetables. This provides an unusual and unique illustration of the influences to which the fruit market is subject.

Faulty Outturn Condition.

IT CAN BE SAID that the market received its first heavy setback from the indifferent outturn of several vessels which followed the "Mooltan," and in particular to the bad carriage by the "Raranga," which cargo was delivered at the end of April.

The effect of the Italo-Abyssinian war began just at that time to reflect itself upon the Australian and Tasmanian fruit trade with Great Britain, for except in mail vessels the cargoes were being transported via the Cape of Good Hope route, owing to the heavy insurance on vessels travelling the Red Sea and to other causes brought about by the Abyssinian conflict. Some of the vessels made extraordinarily long voyages, and besides the fact that the condition of the fruit was not improved, there was the experience of vessels landing varieties of Apples which were looked upon as out of season for sale alongside those

that were "seasonable." The result was that sale values were affected all round. A long period of disappointing prices followed, with only occasional bright patches.

The instituting of sanctions against Italy, and the fact that the London market was bare of the usual supplies of Italian Plums, Mirabelles (Cherry Plums), and Peaches, must have been of some assistance to Apple prices, even though the temptation is to describe it as quite invisible; but on the other hand the Summer Weather in England was such that there was a long drawn-out Strawberry season, which undoubtedly had a very telling lowering effect upon the demand for Australasian Apples of whatsoever variety.

The Quantity of Soft Fruits

on the market during June and the first half of July was always large, and, as showing the eagerness with which the English market is catered for, it is interesting to mention, vide a report in the London "Daily Telegraph," that upon Britain lifting sanctions against Italy, at midnight on July 16, 400 tons of Italian Plums and Peaches reached London at 5 a.m. the following day, that is, only 5 hours from the ending of the official ban! The Italian shippers acted in anticipation, one imagines, and fruit already entrained from Italy was diverted from Belgium to this country. Californian Plums, railed overland to New York, followed—and indeed it can be said that right from the first days of June there was always an abundance of soft fruit.

The Spectre of "Brown Heart."

Early in July, approaching the close of the Australasian selling season, just when prices once more showed a tendency to rise, the market was completely "knocked out" through the bad outturn of the "Jervis Bay" cargo from Tasmania. A small quantity of damaged fruit ex one steamer from New Zealand was withheld from sale entirely. The final vessel to arrive from Tasmania, the "Tudor Star," also unfortunately delivered its fruit in a faulty condition. Thus, it will be seen that a market which was never quite steady found itself repeatedly reeling under difficulties which had dire effects upon the paramount matter of prices.

Quality and Condition.

IT IS NOT EASY TO WRITE under this heading other than by combining the two. What might be very good fruit at the point of shipment can be of poor quality when it reaches the market here, and naturally



R.M.S. "Orion"
leaving Melbourne
with a shipment
of
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(Block courtesy "Vic.
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West Australian Representative	The Westralian Farmers Ltd., Perth.

the buyers do not discriminate between faulty quality and fruit rendered faulty through unsatisfactory carriage. The landed condition of the fruit was not as good as was the case in 1935. This at any time undoubtedly affects the marketman's appraisement of quality.

We, however, shall attempt to separate the two as far as we are able to do from our observations, and from opinions formed upon examination of the fruit of the extent to which the fruit in some instances suffered during sea carriage, in the case of vessels which made long voyages or gave faulty outturn. These two factors were responsible for much of this year's criticism of the fruit. Similarly, there was all the usual talk about immature Apples from Tasmania especially.

It is our opinion that there was less immature fruit from Tasmania this year than usual. There was immature fruit from some of the Mainland States at times, and the same might be said of some of the Dunns from New Zealand. Therefore, although the stigma is usually, almost as a matter of course, regarded by market critics as part and parcel of the Tasmanian reputation, the fact is that Tasmania is not the sole offender.

Again, we say quite definitely that there was far more trouble and loss this year from over-mature than from immature fruit.

Disregarding faults due to or which developed during carriage, however, we believe that on the whole the Australasian Apples were not up to the standard of the 1935 quality for the most part. It was definitely so in the case of West Australia, whose Apples twelve months before were of absolutely superlative quality. The South Australian fruit looked nice and was well up to standard; we had some very attractive Granny Smith, from New South Wales, the deliveries from which State, however, were patchy in the matter of quality at times, but on the whole, due, we believe, to climatic conditions, the Victorian Apples were not equal to the quality of other recent seasons. Some of the dessert varieties lacked color.

In the case of Tasmania, the early shipments were spoiled by extensive bitter pit in Ribston and the breaking down or over-ripeness of varieties such as Alexander, Pomme de Neige and Duke of Clarence. Except where consignments were pitted, the Cox Orange Pippin were very creditable and made good prices. Taking the larger export of C.O.P. into account, it struck us that there was relatively less bitter pit in that variety than in the previous year's deliveries. The mid-season sorts from Tasmania were quite satisfactory, we thought, Cleopatra being an improvement upon the same variety the year before, when prices, however, were so much better and accordingly there were fewer complaints. Tasmania sent some brands of Jonathan which were not bettered by any which reached these markets from any Australasian source.

The prices are apt to "color" one's ideas a little, but taking all varieties it would perhaps be correct to say that the Tasmanian quality as a whole was somewhat short of that of the 1935 deliveries, due, we understand, to climatic conditions during the growing time.

The improvement in packing and presentation of the Tasmanian fruit, it was observed with pleasure, had continued.

There is scope for the Garden Isle and all States to extend this desirable advancement. Reports from New Zealand were to the effect that there had been much bad weather in the principal fruitgrowing districts, followed by storms. The quality of the fruit no doubt suffered, and although there were varieties from New Zealand that showed up nicely, the market opinion was that generally the fruit was not equal on this occasion to the standard of a few years ago.

PEARS.

ALTHOUGH THE EXPORTS OF PEARS from New Zealand were less than in the previous year, and this applied also in the case of Tasmania, the shipments from Australasia as a whole, amounting to 750,000 packages, were higher than those of 1935, and second only to the record export of 1933. The past season's total included the largest quantity ever shipped from the State of Victoria. Only a trifling quantity, about 5,000 packages, went direct to the Continent, in addition to the above figures, which represent deliveries to the United Kingdom. A quantity of about 20,000 standard boxes was transhipped by New Zealand from London to Sweden.

In March, when the first of the Australasian Pears arrived, the prospects did not look at all bright.

First of all, the prices which had been ruling here for the excellent

Pears from Argentine,

were regarded by the trade as being substantially below true normal value of Pears of their undoubted superiority. The duty of 4/6 per cwt. applies, of course, to Argentine Pears.

On the other hand, compared with Australia there is naturally, on account of the so much shorter voyage, the advantage of the lower cost of ocean transportation, namely, 2/- to 2/3 sterling per standard box, arrived at according to the cubic measurement, as influenced by the bulge.

The large proportion bought at firm prices by "forward" buyers in England would make the business on the whole not unpayable to producers in Latin South America, but the prices realised upon arrival were very much lower than had been somewhat confidently anticipated.

On top of this unfavorable portent, the South Africans received prices which for the greater part were extremely disappointing for the large volume of Pears which they sent on to the British markets. Notwithstanding all this, the prices realised for Australasian Pears at times constituted the "bright spots" of a cheerless season.

Both Victoria and New Zealand resorted to cold storing moderate quantities of their Pears, and it is pleasing to find that their enterprise was rewarded by good prices. The Tasmanian Pears on the whole again did very well on a difficult market and one which at almost all times had all the Pears it required. We handled a fairly large proportion of the Tasmanian export of this fruit, and, taking into account the nature of the season here, some remarkably good top prices are to be found running through the account sales, viz.:-

Doyenne du Comice	20/6 per standard box
Doyenne du Comice	9/6 per tray
Josephine	14/3 per standard box
Winter Nelis	14/- per standard box
Beurre Bosc	13/- per standard box
Winter Cole	12/6 per standard box
Giblin's Seeding	12/- per standard box
Beurre d'Anjou	12/- per standard box
Packham's Triumph	12/- per standard box
Black Achan	11/6 per standard box
Easter Beurre	11/6 per standard box

Cold Storage in England.

APPLES FROM SEVERAL of the Australian States were placed in storage in moderate quantities, and we ourselves cold stored a small quantity from Tasmania. Although New Zealand did not ship her full quota under the restriction agreed to with Australia—the shortage being mainly on account of a disastrous cyclone in the North Island and a hailstorm in Nelson—

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Consume **2,500** tons of Apples per week

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THAN FROM ANY OTHER PORT AND SALES
SHOULD THEREFORE YIELD HIGHER NETT RETURNS

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"PORTOMAN," Sydney.

CAPT. W. J. WADE,

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APPLES - PEARS - ORANGES - GRAPES

... from ...

**New South Wales - South Australia
Western Australia**

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the New Zealand authorities cold-stored fully 20 per cent. of their U.K. deliveries.

It is to be regretted that the effort of the Dominion representative to check the downward trend of prices in the glut periods by a cold storage programme did not bring its merited reward. Such a policy was a bold one. It undoubtedly must have assisted the prices which ruled for the other New Zealand shipments, and there is also the fact that Australian and Tasmanian prices benefited likewise—it is probable even that a total collapse was averted largely through the use of cold storage having been resorted to by the New Zealand authorities.

Unfortunately though the market did not recover. We, might mention also that, at the time the demand was almost at a standstill, owing to the abundance of small fruits, we withheld from the market some thousands of cases of Tasmanian Apples which we had properly stacked with battens and with airways between the tiers of cases, in cool but non-refrigerated storage. Again the hoped-for improvement in prices did not eventuate, but there was a small gain, and this also assisted to avert the trouble which at that time was ever impending.

South African Competition.

AT THE EMPIRE FRUIT PRODUCERS' Conference in London in July, which the writer of this review attended, a South African delegate made the startling statement that production in that country was developing so much that in a few years to come the Union would have 2,000,000 bushels of Apples for export. One hopes that forecast was over-optimistic, as indeed it might be. However, there is ample evidence that South Africa is going strongly ahead in Apple growing as an additional branch of its extensive fruit production, in which the figures show that a record export of one year is made only to be eclipsed the following year.

We are indebted to the Overseas Farmers' Co-operative Federations Ltd., for an interesting report showing the big increase in the export of all classes of deciduous fruit from South Africa. In the case of Apples, the puny quantity of 8,541 bushels in 1928 rose steadily to an export to Great Britain of 105,061 boxes in 1934. The exports went back somewhat in 1935, being 71,422 boxes. This year, however, they have totalled 262,962 boxes.

South African Apples arrived on the London market regularly until as late as the first half of June. The quality was excellent for the most part, and the Dunn's Seedling, or Ohenimuri, as it is also called in South Africa, competed most definitely with supplies of culinary Apples from Tasmania and all Australasian sources.

In the contemporary Review referred to, it is stated that "... Retailers who purchased the earliest arrivals of South African Dunn's Seedling required and would accept no other culinary variety until the shipments ceased ten weeks later." There is no doubt that the trade regarded the South African Dunn's Seedling as a "dual purpose" Apple of no superior. The bright appearance and cleanness of the fruit made a strong appeal, and the grading and packing were of high standard. This latter applied also to the White Winter Pearmain and the Delicious—the two varieties which rank next to the Dunn's in point of quantity exported from the Cape.

To sum up, South African Apples, which commence to reach these markets early in March and continue to be available throughout what in any ordinary circumstances is the most valuable section of the Australasian season, i.e., the period before the English soft fruits ripen, must now be regarded as an increasingly serious competitor.

The British imports of South African Pears, on the other hand, were somewhat short of the figures of 1934 and 1935 respectively, but at 610,000 standard boxes were still of very substantial volume. Next to the Williams Bon Chretien (144,000 boxes) the Beurre Bosc (126,600 boxes) was the largest contributor to the South African aggregate. In addition, South Africa exported Apples and Pears to Scandinavia and Mediterranean ports.

Apples and Pears from South America.

As far back as in our Review of the 1927 Australasian season we characterised the increase in fruit production in the Argentine Republic and other parts of South America as a "red lamp giving warning to the Southern Dominions of the British Empire." The systematic growth and production of various descriptions of

Fruit in the Argentine

has been assisted by the Railway Companies, and this together with the advantages of a 19-day voyage to England and a much lower freight than the Australasian



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THE modern Patrick Steamers are specially fitted for the careful carriage of Fruit. Every shipment, whether large or small, is assured of the same personal interested attention. Prompt delivery and the greatest care in handling cargo are features of the Patrick Service. . . . Steamers leave Melbourne, Sydney, Newcastle and Brisbane regularly every week, carrying interstate cargo without transshipment en route. Cargo received daily. No need to book space. Consign your Fruit to us and we do the rest.

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shipments incur, is now becoming more and more apparent each year.

The Argentine exports of Apples are still less than 200,000 boxes, but Pears have exceeded the half-million mark. These figures include shipments to Brazil (a good market for Argentine Pears), Europe and elsewhere.

The U.K. importations from the Argentine this year were 191,742 standard boxes Pears and 17,791 bushel boxes Apples. It was not until early in June that the arrivals of South American Pears finished. In other words, they were on the English markets throughout the entire period of delivery of Australasian Pears.

Chilean Apples did not reach English ports in any quantity, but they are taking the place of Australian and Tasmanian Apples in Hamburg. One prominent importer of Tasmanian Apples in Hamburg handled 140,000 boxes of Chilean Apples this past season, and undoubtedly this will make it harder to resume business with Germany when the present currency and other difficulties to international trade disappear. This year there has been keen competition among coal exporters in various countries to secure the Chilean import demand. Large orders were placed in Germany, and these and other purchases of German commodities enabled Chile to enter into barter arrangements with that country.

On the Scandinavian markets also, Argentine and Chilean Apples have already taken a share of the trade previously enjoyed by Australasia. We repeat our advice of last year that every effort should be made by Australia, particularly, because of its having so long supplied the English markets, to resist inroads into the trade by South American countries. The importance of watching this disturbing feature cannot be over-emphasised.

A South African Experiment.

An experiment was made by South African shippers this past season in the matter of carriage temperature for Apples in ships' holds. A higher temperature was tried, mainly in the shipping of Dunn's Seedlings (Ohenimuri). Complaints had been made that the Apples when landed in England were too green, and so shippers decided to try them out at a higher temperature. The experimental lots were shipped in different chambers with temperatures varying from 40 deg. to 55 deg. F. Those carried at the latter temperature especially arrived in an over-ripe condition, and, generally speaking, the experiment was not a success. It would seem that the usual range of 33 deg. to 34 deg. is to be preferred.

English Market Requirements.

There is an impression here that Australasia will make some further restriction. This presents a difficult problem in view of other countries extending their deliveries on to the U.K. markets, and it was one with which the recent Empire Fruit Conference came face to face.

The suggestion has been made here that the Ribston Pippin be excluded from the export schedule, but the Ribston has the advantage of being a true English variety which often sells well if in sound condition—we made as much as 10/3 a case this season for 2½ and 2½ inch Ribston Pippins from Tasmania. A close examination of the present permissible export sizes might be productive of even more good and less hardship to individual growers.

The English markets have become particularly exacting in the matter of size requirements, preferences and prejudices.

The demand for 2½-inch dessert Apples is shrinking, and to-day it is only Liverpool and Glasgow that can be depended upon to return about the same prices for that size as for the

Popular 2½—2½ Inch Range.

In fact, even in Liverpool, where the 2½ inch size used

to be welcomed, it is now at a discount of 3d. to 6d. per case, according to variety, compared with the smaller sizes. In London, the difference may be anything from 6d. to 1/6; in Hull, 6d. to 9d.

On the other hand, all markets require large cookers, and prefer the 2½ and 3-inch sizes. There is a difference at times of 9d. to 1/- per case between even 2½-inch cooking Apples and the larger fruit which buyers want.

Prospects for 1937.

IT WOULD BE either courageous or foolish to attempt prophecies—so many things can happen to upset a market which is so abundantly supplied nowadays with all classes of fruit from so very many parts of the world. One can go no further than to epitomise a few features which may possess some significance. The Apple crop in the United States is the lightest since 1921. It is officially stated as 27 per cent. less than the Apple crop of 1935, and, what is more, the reports are that there is an excellent home or domestic demand, as it is called.

As regards Canada, the quality of the Nova Scotia crop, unlike last year, is faulty—the late varieties, Ben Davis and Stark, are said to be particularly bad in Nova Scotia—and it is expected that last year's exports of approximately 1,400,000 barrels from that province will not be reached on this occasion by probably 400,000 barrels, or say a difference equal to 1,200,000 boxes or thereabouts.

In British Columbia there is a normal crop, and it is most satisfactory to learn that fruit from that large box-Apple area is rapidly going into consumption at remunerative prices. Drought and weather conditions reduced the crop in Ontario considerably.

Referring again to the United States, this time last year British importers were being deluged with offers of Apples, but there has not been anything like the same pressure from U.S.A. shippers this year. The Canadian export crop to this country should be disposed of by April, and it is likely also that U.S.A. Apples will not be anything like the same big factor that they were last season, and that early arrivals from Australasia will be wanted.

It does not do, of course, to overlook the competition from South African and Argentine Apples, which come on to the markets of Britain just ahead of, and also concurrently with, the new supplies from Australia and New Zealand. Still, there is the fact that that competition, unless there is a disaster in the countries of production, would have to be faced in any case.

More gas-stored English cookers will be available, but there should be at any rate a comparative absence of the rather large quantity of Apples from U.S.A. which competed with Empire supplies from overseas on these markets in April and May of this year. Again, there does seem to be, despite this year's depressing experience, at least very reasonable justification for believing that the healthy state of commerce, industry and employment in most, if not, indeed, all parts of England, will surely sooner or later assist the demand for fruit and the prices paid for it.

There is perhaps a chance that the fortunes controlled by the weather will operate more in favor of Antipodean suppliers in 1937.

Personal.

Again this year Mr. E. Ross, a director of H. Jones & Company Pty. Ltd., of Hobart, Tasmania, has been in England almost throughout the entire selling season. Mr. Ross' presence and co-operation was of advantage in a season which proved to be one of many difficulties. According to present intentions, he will remain for the 1937 season.

SOUTHAMPTON

Britain's Imperial Gateway

"Linking the Producers of the Empire with Markets of Great Britain and the Continent"

PERISHABLE TRAFFIC.

Careful handling, speedy transit, first delivery in the market, is, of course, what perishables require. But before all that the question of cold storage often arises, especially for things like meat and fruit, eggs and fish. This is how it is solved at Southampton Docks.

WHERE PERISHABLES DON'T PERISH.

Right by the quayside are the premises of the International Cold Storage & Ice Company, Ltd., up to date, approved by Lloyd's, one vast building with a total capacity of 1,700,000 cu. ft. And because it is so near the quays, the transfer of produce from the ship to the store is carried out astonishingly quickly, and the time of exposure to the atmosphere is scarcely worth talking about. In fact, goods are under refrigeration practically the whole time from moment of removal from ship's hold until despatch in special railway vans or lorries for the different markets.

SPECIALISED ACCOMMODATION.

Inside, the store has five floors and is divided into sixty-one chambers, so that a great variety of perishables can be accommodated each at its own particular temperature, and under the most suitable conditions. In fact you can have any temperature between zero and 45 degrees Fahrenheit. After a room has been cleared, "Ozone" plant is used to deodorise it, and make it sweet and clean for the next arrivals.

A complete list of what can be found in the store at almost any time would be interminable, but the chief items are fruit, meat, butter, fish, game, poultry, eggs and hops; in fact, anything could be kept there fresh for almost any length of time. Sometimes the produce has not been cleared by the Customs when it enters the store and so there are special bonded rooms for this. As examples of the space available and what can be done, the following is interesting:—

Fruit, 640,000 cu. ft. of storage space has been specially allocated for the reception of fruit. Each chamber has an independent system of refrigeration by cool air circulation, together with means for control of humidity and ventilation. In this way it is possible for every class of fruit to be stored under ideal conditions, and for a large range of temperatures to be maintained.

PEARS: Can be unloaded at the Cold Storage wharf, and sorted up to mark actually in the Cold Store and loaded into refrigerated trucks. From the time the fruit leaves the ship's cold chamber, until it is being sorted to mark in the cold store, is less than five

minutes. The condition of the fruit is therefore kept practically in a refrigerated state until it is actually delivered at Covent Garden, Spitalfields, or whichever Market in London to which the fruit is consigned.

Think of the time saved where vessels call first at a Continental Port—then on to Hull—then London—approximately five days later than those ships would discharge at Southampton.

DESPATCH FROM THE STORE.

Both the road and rail services of the Southern Railway are at your service at the International Cold Store. Delivery to craft can be made with ease.

The advantage of despatching produce by train is that there is a loading platform right inside the store, long enough to take half a full-length freight train. One shunt, and the whole train is complete. And of course special refrigerated railway vans are always provided so that goods arrive at the market just as fresh as when they left their country of origin.

WHY SOUTHAMPTON?

Southampton has not become one of the principal centres for the importation of perishable produce into Britain without reason. In fact, more than thirteen million packages of fruit alone and tremendous quantities of meat and dairy produce arriving each year at these modern docks thoroughly test the arrangements made, and find them perfectly satisfactory.

And it is the often tried efficiency of Southampton which enables it to advance its claims against those of other British ports for the handling of perishable produce.

But there are other reasons. The largest liners can enter the docks at any state of the tide so that there is never any irritating wait before a vessel can be berthed. Also Southampton is the first berthing port by liners approaching England from the south whence the great majority of perishable produce comes. This means that the Metropolitan markets and the industrial Midlands are reached through Southampton considerably quicker than by other routes. The advantages of being first in the market are obvious. Freight trains take only three hours to reach London and service to the Midlands is equally good. In addition, the fact that the population in the South of England is rapidly increasing and now sixteen million people live within a radius of 100 miles of Southampton Docks means that there is a constant and ever ready market at the very doors of the Port for perishable produce which is after all essential to the well-being of this great population.

SOUTHAMPTON DOCKS

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55 York Street - - - Sydney
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TO	Tasmania.	W. Australia.	Victoria.	S. Australia.	N.S.W.	Queensland	Totals.
	Apples.	Apples.	Apples.	Apples.	Apples.	Apples.	Apples.
Total Arrivals, Season 1936	2,739,232	140,782	815,514	46,738	37,501	48,864	564,821
Total Arrivals, Season 1935	2,414,893	197,706	775,913	37,501	48,864	564,821	564,821
Total Arrivals, Season 1934	2,055,611	95,284	564,821	48,864	564,821	564,821	564,821
TO	Tasmania.	W. Australia.	Victoria.	S. Australia.	N.S.W.	Queensland	Totals.
	Apples.	Apples.	Apples.	Apples.	Apples.	Apples.	Apples.
London	1,762,186	132,576	370,013	374,478	177,264	15,140	591,192
Liverpool	409,588	3,543	78,284	22,142	58,563	4,000	26,339
Gloucester	261,734	4,663	9,737	7,201	54,353	971	11,864
Glasgow	25,800	—	45,400	6,305	41,681	50	385,321
Manchester	29,800	—	1,399	—	5,344	—	197,233
Southampton	22,553	—	1,077	—	656	—	27,953
Avonmouth	20,320	—	—	—	485	—	54,612
Newcastle	1,300	—	—	—	—	—	12,161
Hamburg	110,332	562	19,977	—	—	—	1,300
Antwerp	42,312	—	6,000	—	2,486	—	20,256
Rotterdam	39,332	—	10,603	—	—	—	62,921
Stockholm	74,429	4,491	12,600	—	—	—	87,029
Hook of Holland	—	—	11,402	—	11,550	—	22,952
Totals from Aus. States	2,739,232	140,782	815,514	46,738	37,501	48,864	564,821
ARRIVALS FROM NEW ZEALAND FOR SEASON 1936.							
Glasgow.	61,659	9,038	64,537	—	—	—	—
Southampton.	61,659	9,038	64,537	—	—	—	—
Avonmouth.	61,659	9,038	64,537	—	—	—	—
Manchester.	61,659	9,038	64,537	—	—	—	—
Liverpool.	61,659	9,038	64,537	—	—	—	—
Hook of Holland.	61,659	9,038	64,537	—	—	—	—
Totals.	61,659	9,038	64,537	—	—	—	—
SUMMARY, 1936.							
United Kingdom.	4,175,886	635,700	527,755	5,053	4,703,641	640,753	1,022,979
From Australia	961,558	109,552	61,421	582	1,022,979	110,135	750,888
Total from New Zealand	5,137,444	745,252	589,176	5,635	5,726,620	750,888	1,022,979

SOUTHAMPTON

What it Means to Pear Shippers from Australia.

THE Port of Southampton offers excellent facilities for the world's greatest liners down to the smallest freight steamers.

The magnitude of the docks is shown in a photograph received, the distance from the foreground of the photo to the King George V. Graving Dock, shown in the distance, is over 2½ miles.

Owing to the fact that there is no waiting for tides at Southampton, vessels are able to berth right alongside the wharves at any hour of the day or night.

Steamers can be taken right alongside of the International Cold Store and perishable produce is discharged directly from the ship into the cold store, the time taken being considerably less than five minutes from the time the slings leave the ships hold until the goods are actually in the cold store. The capacity of this store is 1,700,000 cubic feet, which is divided up into 61 chambers, each of which can have a separate temperature ranging from between zero and 45 degrees Fahrenheit.

For the quick handling of Pears from Australia to the London Market, Southampton being the first main port in the south of England, and yet only 78 miles from London by rail, very often means that vessels can discharge their freights at Southampton from 4 to 5 days before those vessels reach London.

Pears can be discharged from ship's hold directly into the cold store, sorted to mark, and loaded into refrigerated vans in the cold store and railed to London by express freight trains, which take less than 8 hours to reach the metropolis. This means that a vessel unloading to-day, could have very large quantities of fruit delivered to the London markets practically in a refrigerated state, in time for the early morning sales the following morning. The extra cost of reaching London by this means, including delivery to the markets, works out at approximately 1½d. per case, but the advantages received as a result of the handling facilities, and with practically no loss of refrigeration, means that the fruit reaches the great markets of Covent Garden, Spitalfields and Borough Markets in perfect condition, which should mean better prices to far more than compensate for the very slight additional cost.

J. O. SIMS LTD., LONDON.

J. O. Sims, Ltd., of the Borough Market, is one of the largest handlers of fruit in London. Established in 1896, this firm has huge premises with every facility for quick handling of fruit from all parts of the world. There are four floors in the building. The semi-basement, which is kept at an even temperature all the year round, is an ideal storage place for fruit.

On the first floor there are commodious offices for every department of the business, and private offices for the various managers. There is also a very attractive and spacious room for the use of colonial and foreign friends when visiting London. This accommodation is unique. On this floor also is further storage and sample showing space.

On the next floor, there is one of the lightest and finest show rooms (for displaying sample packages on auction days) to be found anywhere in Europe. There is comfortable seating accommodation for over 300 buyers, and a balcony at the back affording standing room for many more. An electric goods elevator serves each floor.

N.S.W. growers wishing to consign to J. O. Sims Ltd. should get in touch with L. H. Smart Ltd., 23 Macquarie-place, Sydney.

PINE CASES



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The reason for their progress is usually to be found in the fact that the firms in question are giving SERVICE and SATISFACTION to their clients—this is exactly the reason why we have found it necessary to build new Premises at Davey Street, Hobart, which provide modern facilities for the Careful Handling and Packing of Fruit, Storage of Goods, Office Accommodation, etc., all under the one roof.

Simultaneous with our growth in Tasmania, we are always increasing our Sales Organisation Overseas to more efficiently handle the ever-growing quantities of Apples and Pears passing through our hands.

E. R. Cottier
Pty. Ltd.

**Hobart and Exeter
Tasmania**

New Hobart Address:

Davey Street, facing Franklin Square

Export of Apples, Pears and Stone Fruits

Packages which may be Used, Grade Standards, Trade Descriptions, etc.

Apples and Pears Recommended for Export and for Deletion from Export List

THE EXPORT of fresh Apples, Pears and stone fruits from Australia is governed by regulations administered by the Commonwealth Dept. of Commerce and the State Depts. of Agriculture.

In the following information the regulations which applied for 1936 export have been included plus the decisions of the Australian Apple and Pear Export Council recommending certain amendments which are now before the Dept. of Commerce for gazettal.

Regulations.

(a) Subject to succeeding paragraphs, fruit can be packed and exported only in cases and trays or follows:—

Description of Case or Tray.	Inside Measurements in Inches (clear of divisions).			Kinds of fruit for which Case or Tray shall be used.
	Length.	Depth.	Width.	
Australian bushel*	18	14½	8-2/3	Apples only.
Standard bushel	18	10½	11½	Apples only.
Australian half-bushel	18	7½	8-2/3	Apples and stone fruits only.
Standard half-bushel	18	5½	11½	Apples and stone fruits only.
Long Bushel	26	14½	6	Pears only.
Pear	18	8½	11½	Pears only.
Flat half-bushel	26	7½	6	Stone fruits only.
Tray	18	Any depth not exceeding 4in.	14½	Apples, Pears, stone fruits.
Tray	18	Any depth not exceeding 4in.	11½	Apples, Pears, stone fruits.

*Tolerance recommended permitting internal width to 9in. In exporting Pears to the Near East (only) the use of the standard bushel case is now permitted.

Provided that where—

- The dimensions of not less than 95% of the cases and trays included in any consignment are in accordance with the dimensions specified in the foregoing table; and
- The dimensions of the remaining cases and trays included in the consignment are substantially in accordance with the dimensions so specified and the cubic capacity of each of those cases or trays is not more than 5% greater or less than the cubic capacity of a corresponding case or tray having the prescribed dimensions;

the consignor shall be deemed to have complied with the provisions of this regulation in regard to the dimensions of all the cases and trays included in the consignment.

Specifications for softwood "Standard bushel" and "Pear" cases:—

"Standard bushel" cases:—

Each end shall measure 11½in. x 10½in. x ½in. Each side shall measure 19½in. x 10½in. x 5/16in. Unless a side is of one piece it shall comprise two pieces only, and the width of each of such pieces shall not be less than 5½in. The top and bottom shall each be of two pieces which shall measure 19½in. x 5½in. x 3/16in. Four cleats which shall measure 11½in. x ½in. x ½in. shall be used, one at each end top and bottom.

"Pear" cases:—

Each end shall consist of one piece and shall measure 11½in. x 8½in. x ½in. Each side shall be of one piece and shall measure 19½in. x 8½in. x 5/16in.

The top and bottom shall each be of two pieces, which shall measure 19½in. x 5½in. x 3/16in. Four cleats which shall measure 11½in. x ½in. x ½in. shall be used, one at each end top and bottom.

- (e) The fruit shall be packed in clean, new cases or trays manufactured from seasoned softwood or hardwood containing not more than 20 per centum of moisture, smoothly sawn or dressed in a manner approved by the Secretary of the Commerce Dept., the outside edges of which are, where necessary, trimmed in a manner approved by the Secretary, and in the opinion of the Secretary is sufficiently strong to withstand

such handling as is ordinarily incidental to transport to destinations beyond the Commonwealth. Cases manufactured from Karri and Jarrah timber shall have the ends, tops and bottoms dressed on one side at least and the sides shall be smoothly sawn or dressed;

- (f) Each Apple and Pear shall, before being packed into the cases or trays, be wrapped in paper. Packing material shall be used and shall consist of corrugated strawboard, wood-wool or other similar material. The paper and packing material shall be of a quality approved by the Secretary. In the packing of Apples and Pears the fruit shall be protected by the use of packing material on all tops and bottoms of cases and trays, of Apples, and on all sides, tops and bottoms of cases and trays of Pears. Only one layer of Apples shall be packed in each tray.

Grade Standards for Apples.

48 (1). Apples intended for export shall comply with the following provisions:—

- (a) The Apples shall be of the varieties and sizes specified in the Third Schedule to these Regulations applicable to the destinations specified in that Schedule to which the Apples are to be exported;

Provided that the Secretary may permit, for experimental purposes only, the exportation of Apples other than those specified in that Schedule.

The consent in writing of the Secretary shall be obtained prior to the exportation of Apples of the following varieties, namely:—Coleman, Jubilee, King Cole, McIntosh Red, Stayman, White Winter Pearmain and Wellington.

- (b) The outer layers or shown surfaces of the Apples shall be a true indication of the average grade of the contents of the case.

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and huge quantities are dealt with every year. For all information regarding the loading or discharging of fruit and all other cargoes, or sites for new works, manufactories, etc., at the Company's South Wales or Plymouth Docks, apply to

W. J. THOMAS, Chief Docks Manager,
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JAMES MILNE, General Manager - - Paddington Station, LONDON, W.2.

other varieties in this grade the maximum amount of russeting allowed in 30 per cent.

Growers are asked to note the recommendation that the export to U.K. of the following varieties be prohibited after 1938.

Alexander, Australian Beauty, Crow Egg, Reinnette de Canada, Ribston Pippin, Jubilee, Pomme de Neige, Gregory Pomeroy, Aromatic, Ballarat (Stewart's Seedling), Nickajack, Schroeder, Coleman, Mobb's Codlin, Stayman, Willie Sharp.

Pears.

The following varieties of Pears are recommended for export:—

Variety.	Abbreviation.
B. Hardy	Same
B. Anjou	Same
B. Bosc	Same
Doyenne de Comice	Comice
Josephine	Jos.
Packhams Triumph	Packham
Winter Cole	W. Cole
Winter Nelis	W. Nelis
Madam Cole	M. Cole
Glou Morceau	G. Morceau

Pears permitted to be exported in 1937 and thereafter to be prohibited:—

B. de Capiaumont, B. Diel, L'Inconnue.

The following varieties of Pears shall be permitted export during 1937, and thereafter may be prohibited:—

Black Achan	B. Achan
Broom Park	B. Park
B. Clairgeau	B. Clairgeau

The following varieties of Pears to be placed on a "danger" list. They may be exported during the next two years, after which period the list will be reviewed.

Growers are warned that any of these varieties may be retained on the list, or prohibited from export.

Two-Year List.

Variety.	Abbreviation.
Gibbins Seedling	Giblin
Duchess d'Angouleme	D. D. Ang.
B. Britton	B. Britton
Easter Beurre	E. Easter
Williams Bon Chretien	W.B.C.
D. Bossuch	Bossuch
Howell	Howell
Keiffer	Keiffer
Vicar of Winkfield (or Napoleon)	Vicar
Marie Louise	M. Louise
Winter Bartlett	W. Bart.
Lemon Bergamot	—

Russet Tolerance.

"The following varieties of Pears to be described as normally clean-skinned varieties:—

Beurre D'Anjou, Doyenne de Comice, Josephine, Packham's Triumph, W.B.C., Howell, and that they be permitted to carry the following percentage of russet—

Extra Fancy 15 per cent.

Fancy 30 per cent.

No russet restriction to apply to Pears shipped under 'Good' grade, or to those varieties not listed as clean-skinned varieties."

Experiments in girdling citrus trees, which have been undertaken in Western Transvaal, South Africa, are claimed to have given unsatisfactory results. Growers are advised to concentrate on bringing about permanent improvement in their orchards by better irrigation, cultivation, fertilising and pest control.

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Part 1—Apples for Export to Any Destination

Third Schedule.

Apples.

Varieties, classes, and sizes of Apples which may be exported, the abbreviated description of each variety, and the minimum percentage of color, characteristic of the variety, necessary on each Apple for each of the grades "Extra Fancy" and "Fancy"—

Variety.	Sizes in Inches.	Abbreviated Description.	Percentage of color, characteristic of the variety, necessary on each Apple in each grade.	
			Extra Fancy.	Fancy.
Alexander	2½ to 3	Alx.	30	10
Alfriston	2½ to 3½	Alf.	E.C.	E.C.
Aromatic	2½ to 2¾	Aro.	50	20
Australian Beauty	2½ to 2¾	A.B.	50	20
Cleopatra	2½ to 2¾	Cleo.	E.C.	E.C.
Coleman	2½ to 2¾	Cmn.	50	20
Cox's Orange Pippin	2 to 2½	C.O.P.	30	5
Crofton	2½ to 2¾	Crof.	50	20
Crow Egg	2½ to 3	C.E.	30	10
Delicious	2½ to 2¾	Del.	50	20
Democrat	2½ to 3½	Dem.	70	35
Dougherty	2½ to 2¾	Dhty.	40	20
Duke of Clarence	2½ to 3	D.C.	70	35
Dunns	2½ to 3	Dunn's	E.C.	E.C.
French Crab	2½ to 3	F.C.	70 green color	E.C.
Geeveston Fanny	2½ to 2¾	G.F.	50	20
Granny Smith	2½ to 3	G.S.	E.C.	E.C.
Jonathan	2½ to 2¾	Jon.	50	20
Jubilee	2½ to 2¾	Jub.	50	20
King Cole	2½ to 2¾	K.C.	50	20
King David	2½ to 2¾	K.D.	70	35
King Pippin	2½ to 2¾	K.P.	30	10
London Pippin	2½ to 3	L.P.	E.C.	E.C.
McIntosh Red	2½ to 2¾	McIntosh Red	70	35
Mobbs Codlin	2½ to 3	M.C.	E.C.	E.C.
Newtown Pippin	2½ to 2¾	N.T.P.	E.C.	E.C.
Nickajack	2½ to 3	NJ.	30	10
Pomme de Neige	2½ to 2¾	P.D.N.	30	10
Prince Alfred	2½ to 3½	P.A.	30	10
Reinette du Canada	2½ to 3	R.D.C.	E.C.	E.C.
Ribston Pippin	2½ to 2¾	R.P.	E.C.	E.C.
Rokewood	2½ to 2¾	Roke.	40	20
Rome Beauty	2½ to 3	R.B.	30	10
Scarlett	2½ to 2¾	S.P.M.	50	20
Schroeder	2½ to 3	Sch.	E.C.	E.C.
Statesman	2½ to 2¾	Stn.	30	10
Stayman	2½ to 2¾	Stay.	30	10
Stewarts (Ballarat)	2½ to 3	SS.	E.C.	E.C.
Stone Pippin	2½ to 3	S.P.	E.C.	E.C.
Sturmer	2½ to 2¾	S.T.P.	E.C.	E.C.
Tasman's Pride	2½ to 3	T.P.	50	20
Wellington	2½ to 3	Wtn.	E.C.	E.C.
White Winter Pearmain	2½ to 2¾	W.W.P.	E.C.	E.C.
Worcester Pearmain	2½ to 2¾	W.P.M.	50	20
Yates	2½ to 2¾	Yates	50	20

E.C.: Even Color.

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The Dried Fruits Industry

Operations During 1936

Export Season Reviewed

Section 92 Dispute.

IT IS NOW 12 YEARS since the orderly marketing of dried fruits became the responsibility of the Commonwealth Dried Fruits Control Board, and the control or organised marketing for this important primary product was introduced. As an example of closer settlement and intensive cultivation, the dried fruits industry stands first in Australia, and is contributing much to the welfare of the Commonwealth.

In spite of some criticism directed against the activities of the Control Boards, it can be fairly stated that, taking everything into consideration, directed methods have resulted in the better distribution of the increased production, and, with the co-operation of growers and the Australian Dried Fruits Association, in the better production and processing of the various varieties now constituting the main efforts of the industry.

At the moment, it would appear that there is little expectation of any great development in increased production, since the present world markets seem to be well supplied, but it is submitted that some development of the domestic market is still possible, and some cause for hope is entertained that hitherto unexploited markets may yet be developed.

In the meantime, the quality and popularity of Australian dried fruits are being wisely maintained, and dried fruits are becoming increasingly an integral part of the nations' food supplies. At the same time, the education of the public to the value of dried fruits as an article of diet is being, and must continue to be, pressed, in order that a regular demand, at prices that give a satisfactory return to the grower, may be maintained and increased.

Area Under Vine Fruits.

Bulletin No. 29 of the Commonwealth Bureau of Statistics shows that of the 117,347 acres under cultivation for vine fruits at the latest census in 1935, productive vineyards represented 109,315 acres, and unproductive vineyards 8,032 acres. Of the former, 7,271 acres produced table fruits, 47,593 produced wine products, and 54,451 acres were responsible for the production of dried vine fruits.

There has been very little increase in vineyard productive acreage since 1929, when the acreage recorded was 106,174. By 1934 it had increased to only 109,110 acres, and in 1935 stood recorded as 109,315 acres.

Grape Production.

Taking the information from the same source, and estimating 1935 figures as a normal comparison, it is seen that although South Australia has the greatest productive acreage under Grape vines of all States (51,220 acres), and produces the most wine (12,914,905 gallons), Victoria, with 37,592 productive acres, produces the greatest quantity of dried vine fruits, in the vicinity of 30,000 tons per annum.

The total production of Grapes for all purposes in 1935, by States, is shown hereunder:—

	Tons.
Victoria	161,983
South Australia	147,970
New South Wales	32,830
Western Australia	15,756
Queensland	2,155

Converted into vine products, the relative production was:—

	Wine. Gals.	Table. Tons.	Raisins. tons.	Sul. Tons.
Victoria	1,276,176	3,113	3,927	25,710
South Australia	12,914,905	646	1,608	10,626
New South Wales	1,539,274	3,638	250	3,181
Western Australia	496,252	3,214	243	403
Queensland	38,050	1,900	—	—

Currant production totalled 20,852 tons, the contribution by the various States was:—Victoria, 8,801 tons; S.A., 9,259; N.S.W., 755, and W.A. 2,037, making a total of all dried vine fruits of 66,750 tons.

The present gross value of the grape crop for all purposes is estimated at £3,500,000 per annum, which is practically what it was worth ten years ago. This represents a gross value of crop per acre of £30/7/1.

Dried Fruits Production.

According to the report of the Secretary of the Australian Dried Fruits Association (Mr. W. N. Sumner) the crop of dried fruits in 1935 was 66,750 tons, and the estimated crop for 1936 will be 62,765 tons, exclusive of Currants, which are estimated to provide a crop of 12,148 tons, against 20,852 tons in 1935.

The estimate for 1936 is compiled in the following proportions:—

	Currants. Tons.	Sultanas. Tons.	Lexias. Tons.	Total. Tons.
Victoria	3,950	30,005	4,398	38,353
South Australia	5,400	8,581	1,830	15,811
New South Wales	715	4,656	397	5,768
Western Australia	2,083	466	284	2,833
	12,148	43,708	6,909	62,765

In estimating the dried tree fruits crop for 1936, the total for 1936 is made up by Prunes, 2,027 tons; Apricots, 1,460 tons, Peaches, 450 tons, Pears, 241 tons; and Nectarines 56 tons; total of 4,234 tons.

In commenting upon the quality, Mr. Sumner stated that the quality of Peaches and Sultanas was good, and that of Lexias satisfactory. Apricots were generally below the average, owing to adverse weather conditions during the drying period.

The reduced crop of Currants followed damage by heavy rains in January last along the Murray River areas. Muscatels experienced a good demand overseas, owing to the disruption of the industry in Spain following the outbreak of civil war in that country.

If the present average acceptance of our dried fruits by Great Britain, Canada and New Zealand remains approximately normal, and Australian local consumption approximates its average of late years, Australia can continue to produce about 65,000 to 70,000 tons of dried fruits per annum, and gives a reason for the advice of the Dried Fruit Control Board that increased plantings and increased production should not be undertaken.

Exports.

As showing the variations in exports of dried fruits from the Commonwealth, the following table is important. Expressed in tons and covering all varieties, but not including dried tree fruits, for the past ten years, the record reads:—

	Currants.	Sultanas.	Lexias.	Total.
1927	7,551	31,072	2,733	41,356
1928	3,689	13,120	2,378	19,187
1929	14,728	37,517	3,211	55,456
1930	15,328	38,384	3,020	56,732
1931	13,790	20,104	4,025	37,919
1932	12,676	28,831	1,400	42,907
1933	13,250	47,589	4,993	65,832
1934	13,682	36,122	3,918	53,722
1935	16,442	31,811	1,576	49,829
1936	7,231	35,454	3,279	45,964

During 1935 Great Britain's importation of Currants and Raisins was 128,003 tons from all sources, of which Australia supplied 30,725 tons. This compares more than favorably with the figures of ten years previously, which were 114,792 tons and 24,401 tons respectively. Australia now supplies 24 per cent. of Great Britain's requirements, a rise of 2.8 per cent. in the past ten years.

In 1935 Canada took 11,846 tons of Australian Sultanas, 2,186 tons Currants, and 688 tons Lexias, total 14,720 tons, an increase of 192 tons over 1934. Ten years ago, exports to Canada totalled only 776 tons.

New Zealand took 2,705 tons Sultanas, 561 tons Currants, and 524 tons Lexias = 3,790 tons, or an increase of 423 tons over 1934. In 1925 New Zealand's imports of Australian dried fruits were 1,487 tons.

Overseas Markets.

By the operation of reciprocal trade treaties, Australia enjoys preferences in Great Britain, Canada and New Zealand for dried fruits. The effect of such is that in Great Britain, Australian Sultanas and Lexias are admitted free of duty, whilst a duty of £10/10/- per ton is charged upon the produce of foreign countries. Currants are similarly admitted free, and foreign countries are levied a duty of £2 per ton.

In Canada, Australian Currants and Raisins are protected by a preferential duty of approximately £18/18/4 per ton on foreign products, whilst New Zealand admits Australian Raisins for one penny per lb. less than foreign products.

The markets on the Continent of Europe are closed to Australian dried fruits, owing to the greater cost of production in Australia, as compared with that of Asiatic and Mediterranean countries, therefore our principal overseas trade remains to be done with Great Britain.

Research Work.

Whilst no revolution of outstanding character can be reported for 1936, scientific research has gone steadily forward, and the effort has been justified. The co-operation of the Council for Scientific and Industrial Research has been of value. Improvement has taken place in the matter of production and processing methods, and the

high standard of Australian dried fruits has been maintained.

This good work will be continued with the co-operation of producers, and will include the effective distribution of slightly increased production, both on the local and export markets.

Investigations were continued in the matter of storage and preservation of all kinds of foodstuffs, assisted by the Imperial Government in Great Britain. This combined effort has certainly enabled the delivery of our fruit in Great Britain in the highest possible condition, and has assisted in maintaining the good name for Australian dried fruits.

Section 92.

The "James Case."

What is now commonly known as the "James Case" was contested in the Privy Council in England during the year. This memorable case was an appeal against the Australian High Court decision which upheld the validity of the Commonwealth legislation, under Section 92 of the Commonwealth Constitution, under which interstate trade in dried fruits and dairy produce had hitherto been regulated. The Privy Council reversed the High Court decision, and the Commonwealth Government now propose to introduce a new clause (92A) into the Constitution which will give them power to regulate interstate trade as before. A referendum will be required before such action is authorised, the vote will be taken on March 6.

The A.D.F.A. point of that the Privy Council decision does not affect the movement of Australian products by overseas export, however, also that the Association is fully in support of the Government's proposals for a referendum.

Publicity.

During the year, publicity has been continued both in Australia and Great Britain. In Australia it has taken the form of newspaper advertisements, window displays, distribution of recipe books and other literature, lectures and demonstrations from the travelling vans and in public schools and special displays in Agricultural shows, etc.

In Great Britain, posters, hoarding advertisements, window displays, advertisements on motor trucks, newspaper publicity, moving picture gazettes, and many other forms of publicity have been undertaken by Mr. E. A. Hyland, the Australian Publicity Officer in London, in co-operation



Grading Cling Peaches for size in a Californian Peach Cannery.

with other schemes for advertising Australian primary products. Well directed publicity has also been given in Canada and New Zealand.

There can be no doubt that a continuance of this service is both necessary and effective, and that it definitely maintains and tends to increase the consumption of Australian dried fruits.

Personnel of Boards.

In addition to the Commonwealth Dried Fruits Control Board, there are State boards in Victoria, South Australia, New South Wales and Western Australia.

These boards are composed of grower-representatives and the following executive officers:—

Commonwealth.—Chairman, W. C. F. Thomas, C.B.E.; Secretary, R. A. Marx.

Victoria.—Chairman, W. Parker Moloney; Secretary, W. Cremor.

South Australia.—Chairman, G. A. W. Pope; Secretary, W. N. Twiss.

New South Wales.—Chairman, G. J. Evatt; Secretary, G. A. Try.

Western Australia.—Chairman, J. N. Cox; Secretary, E. H. Rosman.

The production of dried vine fruits in South Africa for 1935 was 25 per cent. higher than in the previous year, the total being:—Raisins, 4,464 tons; Sultanas, 2,455 tons, and Currants, 201 tons. In dried tree fruits the chief variety was Apricots, with 1,786 tons, out of a total of 2,924 tons of all varieties. Exports to all countries were valued at £233,399 from 119,549 cwts. of dried fruits.

THE BANANA INDUSTRY IN NEW SOUTH WALES.

It was in 1932 that the production of Bananas in New South Wales assumed big dimensions following the industry having been wiped out because of the ravages of Bunchy Top. Production proceeded to such an extent that for the year ending June 30, 1936, no fewer than 700,540 cases were placed on the Sydney and Newcastle markets. In addition, for the same period, New South Wales growers were responsible for sending 397,959 cases to Melbourne, and 92,298 cases to Adelaide. Until a few years ago most of the Australian Banana requirements came from Queensland, but to-day Sydney is almost entirely supplied from within the State of New South Wales; the Melbourne consumption comprises over 75 per cent. N.S.W. fruit, and the Adelaide market secures practically all its Banana supplies from that State.

About eighteen months ago, owing to the very low prices which had been ruling on the various markets, the growers of N.S. Wales decided to bring their industry under the control of a Marketing Board, and to-day orderly marketing is being carried on in Sydney under the direct control of the Banana Marketing Board for the State of New South Wales, the Chairman of which is Mr. Arthur Stevenson, who was previously a Banana grower. Outside the State the transport and the marketing control is undertaken by the Banana Growers' Federation, of which body Mr. Stevenson is also Chairman. Both organisations more or less co-operate for the common good of the growers. Recently it was decided to undertake an extensive publicity campaign in connection with Bananas, and the Committee of Direction of Queensland, and the N.S.W. Banana organisations combined to place in circulation recipe booklets and other advertising matter which have done much to increase the consumption of Bananas in Australia.

Remarkable Invention

Dries Fruit in 2-3 Days !

Rain or Shine.

The ALL-WEATHER Patent EVAPORATOR

By this process fruit can be dried in 2-3 days with absolute certainty of satisfactory results. The product is remarkably even in color, and comes out with unimpaired bloom, carrying a really appetising appeal to the buyer.

Compare this with the costly and tedious rack-drying process — and, remember, drying can start with picking. Weather cannot affect the efficiency of the evaporator. Rain or shine.

New trays are not required. Simple, economical, efficient, reliable. Requires no attention except for occasional firing.

Saves Time — Saves Fruit — Saves Racks — Saves Worry. Write for Full Particulars.

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Behavior of Fruit in Cold Store

TESTS WITH GAS STORAGE IN ENGLAND.

Gas Storage only possible with Refrigeration and Controlled Temperatures.

(By F. E. Huelin, B.Sc., Ph.D., Assistant Research Officer, Commonwealth Council for Scientific and Industrial Research, located at the Government Cool Stores, Victoria Dock, West Melb.)

THE PRESERVATION OF FRESH FRUIT by the method of gas storage has been given particular prominence recently as a consequence of the very successful results obtained in England with the gas storage of Bramley's Seedling Apples. Relatively large quantities are now kept in commercial gas stores for about eight months, and thus compete with Apples arriving "out of season" from the Southern Hemisphere. The store is kept at about 40 deg. F., and made as gas tight as possible. The carbon dioxide evolved by the Apples in respiration is allowed to accumulate until it reaches 8-10 per cent., and maintained at that level by controlling the ventilation by external air. By this means, the storage period can be considerably increased, as the maximum period in air storage at 40 deg. F., is about five months. Gas storage not only reduces the wastage, but delays ripening, and the Apples retain their flavor for a longer period.

Lower temperatures are unsuitable for the storage of Bramley's, as it is liable to low temperature breakdown. Also, at a higher temperature (e.g., 50 deg. F.), the life is considerably reduced both in air and in gas storage. Hence gas storage can only be successfully applied by using it in conjunction with refrigeration and controlling the temperature at a suitable level.

The commercial gas storage of the Bramley's Seedling variety is a result of investigations carried out at the Low Temperature Research Station, Cambridge, England, by Dr. F. Kidd and Dr. C. West, and their work has subsequently been extended to other varieties. These varieties have been exposed to various atmospheres containing different concentrations of carbon dioxide and oxygen. It has been found that the most suitable temperature and atmosphere varies with each variety, and the conditions so far recommended are as follows:—

	Temperature Deg. F.	Carbon Dioxide %	Oxygen %
Culinary Varieties—			
Annie Elizabeth . . .	34-5	0	21 (Air)
Bramley's Seedling . .	40	8-10	11-13
King Edward VII. . .	37-40	5-10	2.5
Lane's Prince Albert . .	39-40	5	2.5-5
Lord Derby	40	8-10	11-13
Monarch	34	5	2.5-5
Newton Wonder . . .	34	0	21 (Air)
Stirling Castle . . .	40	8-10	11-13
Dessert Varieties—			
Blenheim Orange . . .	37-8	0	21 (Air)
Cox's Orange Pippin . .	39-40	5	2.5
Ellison's Orange . . .	34	5	2.5-5
King Pippin	39-40	0	21 (Air)
Laxton's Superb . . .	40	10	2.5
Worcester Pearmain . .	34-5	5	2.5-5

Four of these varieties have the longest storage life in air, and for them gas storage is of no value. Two culinary varieties, Lord Derby and Stirling Castle, can be kept under the same conditions as are suitable for Bramley's, e.g., 40 deg. F., 8-10 per cent. of carbon dioxide, and 11-13 per cent. of oxygen. This atmosphere can be obtained simply by reducing the ventilation, since most fruits in respiration evolve carbon dioxide and absorb oxygen in approximately equal amounts. Hence the result of respiration under conditions of restricted ventilation is to increase the carbon dioxide content of the atmosphere and reduce the amount of oxygen by an equivalent amount.

On the other hand, the remaining varieties, notably Cox's Orange Pippin, an important high-class dessert variety, can only be kept successfully in atmospheres containing 5-10 per cent. of carbon dioxide and 2.5-5 per cent. of oxygen. In the case of Cox's, such treatment does not delay the onset of storage disorders to an important extent, but ripening proceeds more slowly than in air, and it is considered that the Apples retain their flavor longer.

If the

Oxygen Content of the Atmosphere

were reduced to 2.5-5 per cent. merely by restricting ventilation, the concentration of carbon dioxide would necessarily rise to 16-18.5 per cent., or even higher. Hence, to obtain low concentrations both of oxygen and carbon dioxide, the atmosphere must be scrubbed with a suitable chemical solution which will absorb the excess carbon dioxide.

The most suitable method is to circulate the atmosphere through a fine spray of the solution.

Kidd and West first tried the use of sodium carbonate solution, which absorbs carbon dioxide to form sodium bicarbonate. The sodium bicarbonate may subsequently be decomposed, reverting to sodium carbonate, which can thus be used over and over again.

But this method has been found difficult to apply on a commercial scale. A solution of caustic soda has been tried as an absorbent instead, and has given very promising results.

However, the technique of obtaining atmospheres such as the above is still in the experimental stage; gas storage by the method of reduced ventilation alone has so far been the only method applied in large scale commercial storage.

The effect of gas storage of Conference Pears has also been investigated at Cambridge, and the maximum storage period has been considerably increased at 34-37 deg. F. by using an atmosphere containing 10 per cent. of carbon dioxide and 11 per cent. of oxygen, which can be obtained by reduced ventilation. Kidd and West have also obtained promising results with Potentate Tomatoes by storing them at 50 deg. F. in an atmosphere containing 5 per cent. of carbon dioxide and 5 per cent. of oxygen.

It is clear from investigations overseas that each variety of each sort of fruit needs different treatment, and must be studied separately.

For this reason it is important that work should be done with Australian varieties grown under local conditions. Work in Australia has been confined for the most part to atmospheres obtained by reduced ventilation, as such results are capable of more immediate application.

It is important to know, not only whether the storage period can be extended by gas storage, but whether the method is injurious in certain cases. With some varieties reduced ventilation results in a reduction of the storage life, and the development of disorders, and it is essential that these disorders should be recognised and their development avoided in shipping overseas.

Messrs. W. M. Carne and D. B. Martin in Tasmania have shown that Sturmer and French Crab Apples are very susceptible to Brown Heart, a form of gas storage injury. This disorder becomes apparent at 32-34 deg. F. in 5 per cent. of carbon dioxide or less. The Jonathan variety is apparently not so susceptible, as Brown Heart only appeared in this variety when the carbon dioxide increased to over 10 per cent.

Cold Storage in Developing .. has been .. the .. A Big Factor Fruit Industry

BECAUSE It has stabilised the apple and pear industry—enabled markets to be regulated—increased the marketing period—assisted in developing interstate markets. Cool stores have also become a necessary adjunct to canneries and have proved particularly valuable for pre-cooling pears and peaches before canning, and for controlling the ripening process.



The illustration herewith shows a typical 6,000 case fruit store which provides oil store, cooling tower and condenser house, engine room, case dump and grading room.

The cool store and buildings on an orchard are a permanent asset and increase the value of the property. Stores with capacity from 5,000 to 10,000 cases can be built and equipped to an approximate all-round figure of 5/6 to 6/6 per case. Designs and estimate of cost and methods of financing will be submitted on request.

Increased production and limitation of export markets necessitate further developments of local and Interstate markets. Cool stores can also assist in these developments, and many individual orchardists are finding that a cool store on their property is a valuable asset. Some of the reasons are set out below:—

(1) Convenience of having a store on their own property. (2) Saving of time and expense in carting their fruits from orchard to district store. (3) Providing of facilities for an up-to-date packing and grading room within a stone's throw of the house. (4) Space for storing material such as cases, shooks, wrapping paper, wood wool, etc. (5) Running costs are phenomenally low.

"WERNER" Plants Refrigerate over 1 ¹/₂ Million Cases of Fruit in over 60 Stores Throughout the Commonwealth

SYSTEM OF REFRIGERATION

Practical research has developed a new direct expansion method of refrigeration, used in combination with a system of depositing, etc. (patent applied for), and it is generally agreed that this system, as far as the storage of apples and pears is concerned, is a vast improvement on the old air circulation system. Many stores have changed over from the old battery system to the direct expansion method with very satisfactory results, and considerable saving in cost of operation and maintenance. We shall be glad to submit an estimate covering the cost of conversion to direct expansion, or for new stores, on request.

ENQUIRIES INVITED ON ALL COLD STORAGE PROBLEMS

Write to—**R. WERNER & CO. PTY. LTD.**

Refrigerating Engineers

54-86 BURNLEY STREET - - RICHMOND

Phones: J 1161 (6 lines).

CITY SHOW ROOM: 610 LITTLE COLLINS STREET, MELBOURNE.

Phone: M 1145.

AGENTS:—

N.S.W.: R. J. LINDSAY,
 99 Kippax St., Sydney.

S.A.: W. J. WHITE.
 3 Trevelyn Street, Wayville.

W.A.: ATKINS (W.A.) LTD.,
 894 Hay Street, Perth.

The investigations at the Government Cool Stores in Melbourne are being carried out by the author, in association with Dr. S. A. Trout, of the Commonwealth Council for Scientific and Industrial Research, and Mr. G. B. Tindale, of the Victorian Department of Agriculture.

With Jonathan Apples, the use of 10 per cent. of carbon dioxide resulted in Brown Heart, but promising results were obtained with 5 per cent. of carbon dioxide at 37 deg. F.

Peach Storage Life Increased.

The use of 8 per cent. of carbon dioxide at 32 deg. F. has been found suitable for four varieties of Peaches, the storage life of which has been increased by about 50 per cent. The storage life of three typical varieties—Smith's, Zerbe, and Millicent—is only about 6 weeks under ordinary air storage conditions at 32 deg. F., which is hardly long enough for export purposes. Under gas storage conditions the storage life is increased to about 9 weeks.

Tests With Plums and Oranges.

On the other hand, most varieties of Plums have been injured by gas storage at 32-37 deg. F., and the storage life has been reduced by the presence of 5 per cent. of carbon dioxide or even less.

Gas storage also appears unsuitable for Washington Navel Oranges, because a peculiar flavor has been sometimes detected in Oranges stored in 5 per cent. of carbon dioxide.

The work in Melbourne is now being extended to the investigation of gas mixtures containing low concentrations, both of oxygen and carbon dioxide, which cannot be obtained by reduced ventilation alone. Such gas mixtures have given promising results in some cases overseas, and it may sometimes be possible to extend the storage life further by this treatment.

The Gas Storage Technique

which has been developed at Cambridge involves the use of artificial atmospheres, which are maintained continuously at controlled temperatures. A different method has recently been developed in the United States in connection with the overland transport of fruit from the Pacific Coast to cities in the East. Such fruit is carried on the railroads in iced cars, and it has been found that the fruit can be carried in much better condition if the carload is given an initial treatment so that the carbon dioxide content of the air is raised to about 30 per cent. After the car is closed, carbon dioxide is added to the atmosphere, usually by the insertion of the solid form ("dry ice") amongst the cargo. Nearly all of the added carbon dioxide is lost in the first two days of transit.

Gas Storage Still Experimental.

In conclusion, it needs to be emphasised that gas storage is not a method that can be applied indiscriminately, as it is of no value for some fruits, and others are easily injured by unsuitable temperatures and atmospheres.

Further, it has been shown that under certain conditions the ripening of certain kinds of immature fruit is accelerated by ethylene gas evolved by ripe fruit. As this gas would accumulate much more rapidly in gas storage, its effect might possibly be more pronounced and lead to early wastage.

Gas storage is at present essentially a subject for careful study with each variety of fruit under different storage conditions.

Favorable results produced experimentally with any one fruit would necessarily have to be confirmed over several seasons before the method could be recommended for commercial practice, and for this reason, the results of work in Melbourne, outlined above, must still be regarded as only tentative. It is still hazardous for commercial interests to attempt any wholesale application of gas storage methods in this country.

Australian and New Zealand Cool Stores

CASE CAPACITIES

VICTORIA.

Capacity in Cases.

Govt. Cool Stores, Victoria Dock	250,000
Shepparton Cannery Cool Stores	140,000
Orchardists' Co-op., Doncaster East	134,000
Harcourt	80,000
Shepparton Fruitgrowers	60,000
Blackburn	55,700
Ringwood	50,223
Ardmona	50,000
Australasian Jam Co.	50,000
West Doncaster	40,000
Wantirna	39,200
Tyabb	38,270
Hastings Cool Stores	34,000
Burwood East	33,500
Kyabram Preserving Co.	33,000
Hurstbridge	32,000
East Doncaster	31,500
Mount Waverley	30,420
Sennitt & Son Pty. Ltd.	30,000
Red Hill	29,000
Somerville Cool Stores	22,000
Valley View Orchards, Pakenham Upper	24,000
Croydon Cool Stores	21,056
Angliss & Co. Pty. Ltd., W.	20,000
Templestowe Cool Stores	20,000
Box Hill Ice and Cold Storage Pty. Ltd.	20,000
Diamond Creek	17,800
J. Brunning & Sons, Somerville	17,500
Lawford, E., Doncaster	17,000
Graceburn Valley, Healesville	17,000
Maryborough	16,000
Pakenham	15,000
Portland	15,000
Narre Warren	15,000
Two Bays Nurseries & Orchard Pty. Ltd.	15,000
Essendon Ice Works	14,000
Lawford, V.	12,500
Apted, Geo., Arthur's Creek	11,000
Johns, R., Queenstown	11,000
Pyke, F. C.	11,000
Richmond Ice Works	11,000
Dobson Bros., Ferntree Gully	10,000
Bendigo Fruitgrowers' Co-op. Association	10,000
Geelong	10,000
Fitzroy Ice Works	10,000
Heatherlea, Croydon	10,000
Elinora Orchards	10,000
Petty, Herb.	10,000
Petty, F., Tecoma	10,000
Ireland, A. E., Doncaster	9,000
Brunswick	8,000
Australian Ice Works, Ballarat	8,000
Jenkins, Scoresby	7,000
Scott, D., Greensborough	7,000
Tynong (W. C. Thomas & Co.)	7,000
Carpenter, J. D., Hastings	6,500
Burke Bros., Diamond Creek	6,500
Bunyip	6,118
Robinson, T., Scoresby	6,000
Heinz Bros., Ballarat	5,000
Finger, F., Balwyn	5,000

Haysey, R. E., Narre Warren N.	5,000
Corbett, D. J., Doncaster	5,000
Muller, O., Queenstown	5,000
Jenkins, W. R., Doncaster	5,000
Bailey, J. W., Narre Warren	3,800
Shearer, O. J., Nutfield	3,000
Mordialloc Ice Works	3,000
Moore, J. E., Panton Hill	2,500
Clark, T. J., Diamond Creek	2,500
French, Deepdene	2,500
Cobram (P. Rossiter, Citrus Fruit)	2,500
Cool Stores, J. Hanley	2,000
Smith, W. J., Panton Hill	2,000
Kent, Narre Warren	2,000

Total 1,790,587

New South Wales.

Orchard Ice and Cold Storage Works, Orange	100,000
Batlow Packing House	65,000
Dark's Cold Stores Ltd., Newcastle	65,000
Rogers' Meat Company, Orange	51,000
Municipal Cold Storage Works, Sydney	50,000
N.S.W. Fresh Food and Ice Co. Ltd., Sydney	35,000
Orange Fruitgrowers' Cool Stores Ltd.	30,300
Leeton Cannery	30,000
Sydney Cold Stores Ltd.	30,000
Market Cool Stores, Sydney	18,000
Griffith Producers' Co-op. Co. Ltd.	17,000
Co-op. Cool Stores, Kentucky	16,000
Arnot, A. J., Batlow	11,000
Young Cool Stores Rural Co-op. Society Ltd.	10,000
Werrima Orchard Cool Stores, Wingello	8,000
Lavington Butter Factory	8,000
Wallace & Co., Wagga	5,000
Ward S. E., Kentucky	3,100
Oldfield & Sons, W. E., Queanbeyan	2,500
Frearne, H., Kentucky	2,100
Westbury, F. J., Kentucky	2,000
Hyland & Sons Pty. Ltd., David, Sydney	1,500
Yenda Producers' Co-op. Society Ltd.	800
Mort, D. R., Leeton	500

Total 561,800

South Australia.

Metropolitan & Export Abattoirs Board, Port Adelaide	100,000
Producers' Cold Stores Ltd., Adelaide	100,000
S.A. Cold Stores, Hilton	60,000
Govt. Produce Dept., Adelaide	30,000
Start Producers' Society Ltd.	18,000
Balhannah Cold Stores Ltd.	17,000
Cudlee Creek Co-op. Society Ltd.	16,000
Gumeracha Fruitgrowers' Co-op. Scty. Ltd.	16,000
Heysen, O., & Son, Adelaide	12,000
Lenswood Cold Stores Ltd.	12,000
Mattiske, J. W., Angaston	7,000
Redden & Sons, W. J., Verdun	6,000
Kelsey, R., Balhannah	3,000
Norsworthy, P. G., Williamstown	3,000
Redden & Sons, W. J., Cudlee Creek	3,000

Total 403,000

Tasmania.

H. Jones & Co., Hobart	300,000
Port Huon Fruitgrowers' Association	120,000
Huonville Cool Stores	60,000
Huon Deep Water Cool Stores	50,000

Beauty Point Cool Stores	48,000
Cygnat Cool Stores	40,000
Moonah Cool Stores, Hobart	36,000
Bender & Co., Launceston	30,000
Lilydale Cool Stores	20,000
W. H. Calvert, Judbury	12,000
Rostrevor Estate, Triabunna	12,000
Walpole, Devonport	10,000
Total	738,000

Western Australia.

(Case Capacity Not Available.)

Westralian Farmers' Ltd. Fremantle, Albany & Bridgetown	
Illawarra Orchard Co. Karragullen	
Mt. Barker Cold Storage Co. Mount Barker	
Bridgetown Cool Stores	Bridgetown
Western Ice Company	Perth and Fremantle
Perth Ice Works	Perth
Bantock's Ltd.	Subiaco
Baker Bros.	East Fremantle
W. A. Meat Export Co.	Robb's Jetty
Macfarlane & Co.	Perth

New Zealand.

Storage Capacity,
Bushel Cases.

Auckland Farmers' Freezing Co., Auckland	184,000
Harbor Board Cool Stores, Wellington	128,000
Co-op. Dairy Freezing Co. Ltd., Wellington	100,000
Motueka Cool Stores Co., Motueka	40,000
Nelson Freezing Works, Stoke, Nelson	40,000
Turners & Growers, Auckland	40,000
Frozen Products Ltd.	35,000
Papanui Cool Stores Ltd., Papanui, Christ- church	35,000
H. G. Slater Ltd., Hastings	35,000
Westfield Freezing Company, Auckland	35,000
Masson & Masson, Te Kauwhata	27,000
Ashcroft & Edwards Ltd., Hastings	26,000
F. Sisson, Papanui, Christchurch	26,000
J. Wattie Canneries, Hastings	26,000
Wardell Bros., Christchurch	25,000
Elite Cool Storage Co., Hastings	22,500
Canterbury Orchardists' Co-op. Ltd., Christ- church	20,000
Southdown	16,000
Gisborne Sheepfarmers' Freezing Works, Gisborne	12,500
Radley & Co., Auckland	10,000
W. Sisson, Hastings	10,000
A. Frost, Hastings	9,000
W. A. Tate, Greytown	9,000
Christchurch Fruit & Produce Co., Christ- church	8,000
J. H. Milne, Hastings	7,000
H. G. Apsey & Co. Ltd., Hastings	6,000
Radley & Co., Christchurch	6,000
Maitland Cool Stores, Nelson	6,000
Crystal Ice Co., Dunedin	5,000
E. J. R. Milne, Hastings	5,000
N.Z. Farmers' Co-op. Assn., Christchurch ..	3,500
E. French, Hastings	3,000
W. K. McMiken, Hamilton, Hastings	2,500
G. C. McMurtry, Brightwater, Nelson	2,500
E. Sisson, Papanui, Christchurch	2,000

Total 967,500



Mr. B. Krone,
Fruit Packing In-
structor, Victoria.

Packing Apples and Pears

For Local and Export Markets

Charts and Illustrations of Methods

(By B. P. Krone, Fruit Packing Instructor, Victoria.)

By courtesy of the Victorian Journal of Agriculture and Mr. Basil P. Krone, Fruit Packing Instructor, Department of Agriculture, we are privileged to bring to our readers the latest methods used in packing Apples and Pears. It will be remembered that Mr. Krone contributed a similar article in the 1936 "Fruit World Annual," but the accompanying article has been revised and brought up to date. The blocks are shown by courtesy of the Editor of the "Journal of Agriculture."

IF APPLE-GROWERS are to compete successfully on overseas markets, it is essential that they should adopt the methods of packing already in use by other large apple-producing countries. Growers in the United States of America, South Africa, and New Zealand, already have demonstrated the value of the "straight" method of packing Apples diagonally in the Canadian standard fruit case, and if Victorian fruit is to meet that of our competitors on equal terms, it is necessary that we should fall into line so far as this practice is concerned.

The accompanying Apple packing chart for the Canadian "standard" case (inside measurements—18 inches long, 11½ inches wide, and 10½ inches deep) has been revised to meet the needs of the Victorian Apple exporter. This has been done after careful consideration, based on experience gained in this State and on observations of the methods of packing in other parts of the world. The diagrams given are self-explanatory, and the chart indicates the methods of packing necessary to produce the various counts.

Experienced packers will notice that the commercial counts have been reduced to a minimum and, to avoid confusion, "foreign counts" are not described or shown. Any count not shown on the chart may be regarded as a "foreign count," and is not recommended for export.

Packing.

All the counts are packed on the diagonal system; but instead of the Apples being placed at angles to one another, they are placed in the cases with their stalks facing in one direction with the exception of the last Apples in each layer which are reversed to prevent stalk damage, as is done with Oranges. This is shown in the accompanying diagrams.

These diagrams also illustrate the "straight" method of diagonal packing which is necessary in order that the stalks will fit in the spaces between the fruit and not damage it. The last Apples in each layer are reversed.

Large spaces between the fruit reduce bruising to a far greater extent than small spaces. This is one of the reasons the "straight" method of diagonal packing, which

produces larger spaces in comparison with the "angle" method, is recommended. Another vital reason is the adoption of standard counts and the elimination of foreign counts, therefore:—

Remember that "angle" packs are obsolete; they produce foreign counts, and must not be used for export.

The Bulge.

It has been found from experience that the most suitable bulge across the centre of the case, before lidding, is approximately 1½ inches, while at each end of the top layer the Apples should not project more than about ¾ inch, otherwise bruising will occur in the lidding process. The bulge is obtained by selecting Apples very slightly smaller than the rest for the beginning and end of each layer.

Although smaller Apples should be placed at each end of each layer to create the bulge, it is particularly desirable that this practice be rigidly adopted for medium to large sized fruit, and should never be omitted from the 125 and 138 counts, otherwise severe bruising will occur in the lidding process.

Sizing.

It is imperative that the counts and not the size should be branded on the ends of the cases. Remember that standardisation of counts is vital when packing Apples for export. The most suitable counts for export are from 234 to 125 inclusive. The 175 count is an exclusive count for flat Apples. Do not export Jonathans under this count. It should be pointed out that the count is the essence of the contract, and not the diameter of the fruit. The Apples in each case should, of course, be approximately one size. The packer will readily understand that the diameters must be sufficiently large to permit each case being filled to its maximum capacity, but no more.

One vital reason why sizes should not be used is as follows:—Some counts cannot be faithfully packed if sized in equal gradations of ¼ inch. Conversely, some sizes when graded to the equal ¼ inch, such as 2½, 2½, 2½, and 3 inches, result in slack packing and under-weight cases. For example, the 198 count, when correctly packed, should include a large number of both small 2½ inch and large 2½ inch Apples.

Incorrect packing of the 125 count also is a cause of under-weight cases arriving in the United Kingdom. Apples too small for the count are responsible.

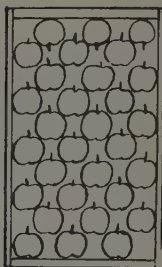
Wire seal all cases to prevent breakage and loss in transit.

Corrugated cardboards should be used at both the top and bottom of the case. Cardboards manufactured in fast colors should be selected and placed in such a manner that the corrugations face the wood of the case and do not touch the fruit.

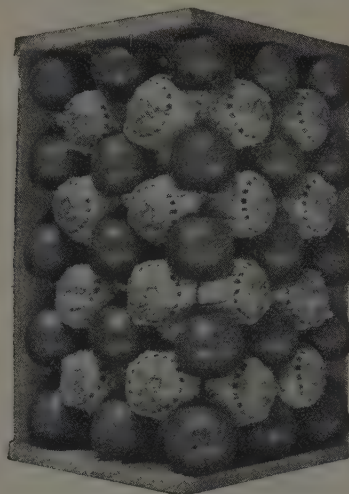
Packing Chart for the Canadian Case

(Packing to counts and not to sizes eliminates underweight cases in the export trade.)

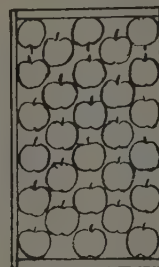
The "Straight" Method of Diagonal Packing.



3-3 Pack.



Granny Smith Apples packed in the standard case. (113 count.)



3-2 Pack.

Gravity Ball-Bearing Roller Conveyor



will Reduce your
Handling Costs
SAVES
Money
Time
Labour
Damage

**The Schumacher Mill
Furnishing Works**

Proprietary Limited

Port Melbourne, Victoria

P.O. Box 2.

Phone M 2171 and 2172

PACKING CHART FOR THE STANDARD (CANADIAN) CASE (Con'td.)

To obtain correct counts; avoid damaged fruit and underweight cases.—Apples should be reasonably uniform in size and packed in accordance with the Rule shown in the Remarks column. To do this successfully, it will be necessary to forget the established custom of sizing in gradations of equal quarter inches. Some counts may be between these sizes.

Count.	Pack.	Layer.	Layers.	Remarks.
270	3—3	8 x 7	6	The correct height cannot be obtained unless the packer regulates the tightness of the pack in accordance with the size of the Apples for a given style of pack. The following rule therefore should be observed:—The smallest Apples intended for the 3—3 and 3—2 packs should be packed a little more tightly than usual, while the largest Apples intended for these packs should be packed more loosely than usual.
252	3—3	7 x 7	6	
234	3—3	7 x 6	6	
216	3—3	6 x 6	6	
198	3—3	6 x 5	6	
180	3—3	5 x 5	6	
175 flat	3—2 Apples	7 x 7 only	5	
163	3—2	7 x 6	5	
150	3—2	6 x 6	5	
138	3—2	6 x 5	5	
125	3—2	5 x 5	5	Special Note.—The correct adjustment of an efficient fruit-grading machine will automatically produce in rotation in its bins each count as shown on this chart. Some machines produce two counts per bin.
113	3—2	5 x 4	5	
100	3—2	4 x 4	5	
96 flat	2—2 Apples	6 x 6 only	4	
88	3—2	4 x 3	5	
88 flat	2—2 Apples	6 x 5 only	4	

The figures in heavy face type are the counts recommended for export.

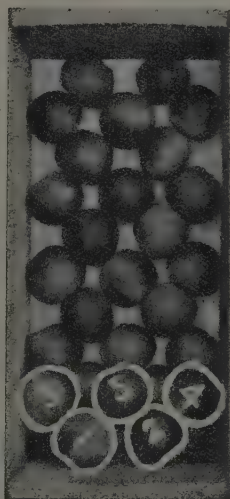
The Australian Dump Case

No change has been made in the method of packing the Australian Dump Case. The "angle" method of diagonal packing is still recommended.

All sizes, irrespective of the pack, fit firmly, but not too tightly in the Dump case. The Apples should not be packed too high or too low; either is harmful, and results in bruised fruit. For the best results the top layer should project about $\frac{1}{2}$ inch above the top of the case before lidding.

Corrugated cardboards manufactured in fast colors should be used at the top, bottom, and each side of the cases; these should be placed in such a manner that the corrugations face the wood of the case and do not touch the fruit.

Lack of uniformity in the manufacture of this case has, from time to time, been the cause of severe criticism from the export trade; therefore the correct specifications should be closely observed.

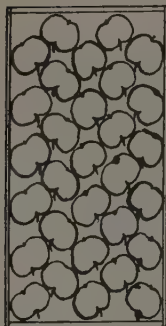


The 3-2 Pack in the Dump Case.

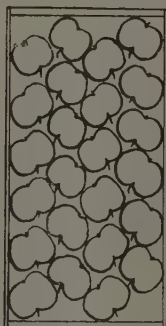
The illustration on the left shows how to commence the first and second layers. Note the angles at which the Apples are placed. The numbers show the commencement of the second layer with the Apples resting on the pockets or spaces caused by the way the fruits beneath are packed. The illustration on the right shows the finished case of 2 $\frac{1}{2}$ inch Apples, 5 x 5 layer, 7 layers; Total 175.

Chart for Packing Apples in the Australian Dump Case

(Inside measurements, 18 inches long, 8-2/3 inches wide, 14 1/4 inches deep.)



3-2 Pack.

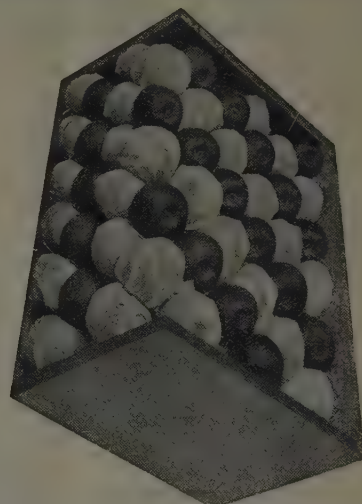


2-2 Pack.



2-1 Pack.

Showing the method of placing Apples in the bottom layer of the 3-2, 2-2, and 2-1 packs.

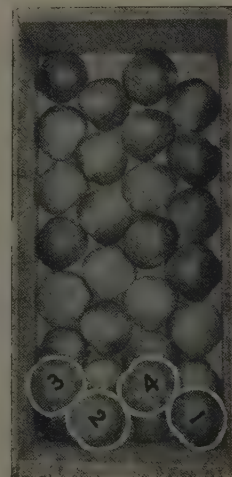


THE 2-2 PACK IN THE DUMP CASE.
Finished case of 2 1/2-inch Apples, 6 x 5 layer,
6 layers: Total 132.

Correct height is obtained by adopting the following rule:—All sizes are packed firmly with the exception of 2 1/2 inch with 175 Apples, small 3 inch with 108 Apples, and 3 1/4 inch with 53 Apples; these should be packed more loosely than usual.

Approximate

Size. Inches.	Pack.	Layer.	Layers.	Total.	Remarks.
2 1/2	3-2	8 x 8	7	280	Small flat shape
	3-2	8 x 7	7	263	Flat shapes
	3-2	7 x 7	7	245	Small quarters
	3-2	7 x 6	7	228	Medium quarters
	3-2	6 x 6	7	210	Large quarters
2 3/4	3-2	6 x 5	7	193	Small halves
	3-2	5 x 5	7	175	Medium halves
	3-2	5 x 4	7	158	Large halves
	2-2	7 x 7	6	168	Large halves—seldom used
2 3/8	2-2	7 x 6	6	156	Small three-quarters
	2-2	6 x 6	6	144	Medium three-quarters
	2-2	6 x 5	6	132	Large three-quarters
	2-2	5 x 5	6	120	Large three-quarters
3	2-2	5 x 4	6	108	Small to medium
	2-1	7 x 7	5	105	Flat shapes
	2-1	7 x 6	5	98	Flat shapes
	2-1	6 x 6	5	90	Large 3-in.
3 1/4	2-1	6 x 5	5	83	
	2-1	5 x 5	5	75	
	2-1	5 x 4	5	68	
	2-1	4 x 4	5	60	
3 1/2	2-1	4 x 3	5	53	Pack more loosely



THE 2-2 PACK IN THE DUMP CASE.

The numbers show the angles at which the Apples should be placed in the first and second layers.

**Gerrard Sales
and Service**

GERRARD WIRE TYING MACHINES CO. PTY. LTD.

"Made in Australia" is a welcome note in any good Australian's buying. Gerrard machines, wire-seal strapping and packing requisites are Australian-made.

GERRARD
The Neat Bind

Melbourne, Sydney, Brisbane, Townsville, Perth, Adelaide, Hobart

DO YOU USE THE BEST CASE . . . ?

BLUE CLEAT★ Cases are made as good as Cases can possibly be made: thus quality, dryness and manufacture is better than that in any other case: but in price BLUE CLEAT★ boxes are equal or lower than all others.

**The Blue Cleat*
The Quality Case for Quality Fruit



National Boxes are Stocked by all Leading Fruit Packers and Bulk Loaders Throughout New South Wales and Tasmania.

Tas. Representative:
J. R. GREEN
Pty. Ltd.
Launceston.



Albury Repres.:
R. S. PHELPS
Albury.

The BLUE CLEAT* our Reg. Trade Mark — and Your Guarantee of Quality.

THE LARGEST FRUIT CASE MANUFACTURERS IN N.S.W.
PLEASE MENTION "THE FRUIT WORLD"

Packing Pears For Export

HARVESTING PACKING METHODS

THE MOST IMPORTANT FACTOR in the export of Pears undoubtedly is the stage of maturity at which the fruit is harvested. Errors in harvesting are readily discernible in the Williams' Bon Chretien variety. The following hints may help in the elimination of these defects: —

The best time to harvest Pears (particularly the W.B.C. variety) is indicated by—

1. The change of the ground color of the skin from dark green to pale green.
2. The changing of the dots or lenticels from a light to a dark or corky appearance.
3. The well-filled-out appearance of the Pear.
4. The ease with which the fruit can be separated from the spurs when harvesting.
5. In a Pear ready for harvesting the juice immediately rushes to the surface when a slice is cut from the fruit; if it remains dry the fruit is still immature.
6. Between January 14 and 24 has proved, over a period of years, to be the most suitable harvesting period for W.B.C. Pears for export.

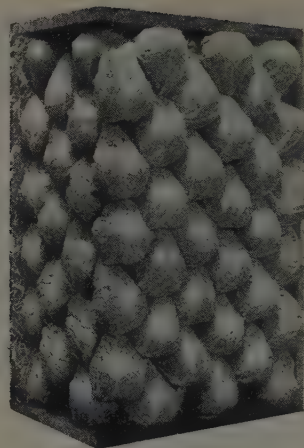
Temperatures.—Pears should remain in cool store at least 48 hours before packing; the temperature should be 29-31 deg. F.

Temperature of the truck before loading should be 50-56 deg. F.

The core temperature of Pears at loading should be 30-35 deg. F.

If these suggestions be followed closely the temperature of the truck upon arrival at the boat should be 40-45 deg. F., with the core temperature of the Pears between 35 and 40 deg. F.

On no account should the temperature of Williams' Bon Chretien Pears on arrival at the boat for export be more than 45 deg. F.



The 8½-inch Standard Pear Case.

The packs shown on the chart given below embrace long, medium and short varieties. They have become standardised in the markets of the world. Packs other than these are known in the trade as foreign counts. A bulge of approximately 1½ inches is necessary when packing this case, the net weight of which should not be less than 42 lb.

Sizing in the well known gradations of ¼ inch are the cause of either slack or over-filled cases and bruised fruit. It is imperative that the count and not the size should be shown on the end of the case. For this reason sizes are not shown.

Chart For Pears in the 8½-in. Standard Pear Case.
(18 inches long, 11½ inches wide, 8½ inches deep—inside measurements).

Count.	Pack.	Layer.	Layers.	Remarks.
245	4-3	7 x 7	5	Note. — Correct height cannot be obtained unless the packer regulates the tightness of the pack in accordance with the size of the Pears for a given style of pack. The following rule therefore should be observed: — The smallest Pears intended for the 4-3, 3-3, and 3-2 packs should be packed a little more tightly than usual, while the largest Pears intended for these packs should be packed more loosely than usual.
228	4-3	7 x 6	5	
210	4-3	6 x 6	5	
193	4-3	6 x 5	5	
180	3-3	6 x 6	5	
165	3-3	6 x 5	5	
150	3-3	5 x 5	5	
135	3-3	5 x 4	5	
(120)	3-3	4 x 4	5	
(120)	3-2	6 x 6	4	
110	3-2	6 x 5	4	
100	3-2	5 x 5	4	
90	3-2	5 x 4	4	
80	3-2	4 x 4	4	
70	3-2	4 x 3	4	

Specifications of timber required to make the standard Pear case are as follows:—

Ends.—2 pieces, 11½ inches long, 8½ inches wide, ½ inch thick.

Sides.—2 pieces, 19½ inches long, 8½ inches wide, 5-16 inch thick.

***Tops and bottoms.**—4 pieces, 19½ inches long, 5½ inches wide, 3-16 inch thick.

Cleats.—4 pieces, 11½ inches long, ½ inch wide, ½ inch thick.

*Tops are also cut ¼ inch longer to allow for the bulge.

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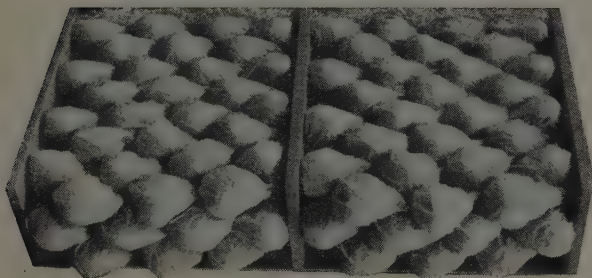
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PACKING PEARS—(Continued).**THE "LONG" BUSHEL CASE**

Packing Chart for Pears in the "Long" Bushel Case.

(26 inches x 6 inches x 14 inches, inside measurements, clear of the division.)

Approximate Size. Inches.	Pack.	Layer.	Layers.	Total.	Remarks.
Medium and Short Types such as Packham's, Josephine, Etc.					
2	2—2	4 x 3	8	224	Normal pack
2½	2—1	5 x 4	8	216	Normal pack
2½	2—1	4 x 4	8	192	Normal pack
2½	2—1	4 x 3	8	168	Normal pack
2½	2—1	3 x 3	8	144	Pack more loosely than usual
2½	2—1	3 x 3	7	126	Normal pack
2½	2—1	3 x 2	7	106	Pack more loosely than usual
2½	2—1	3 x 2	6	90	Normal pack. If Howell, etc., mix 106 and 90 and pack as 96.
3	1—1	4 x 4	6	96	Stalks face centre of case
3½	1—1	4 x 3	6	84	Stalks face centre of case
Long Types, such as Beurre Bosc, Etc.					
2½	2—1	4 x 4	8	192	Normal pack
2½	2—1	4 x 3	8	168	Normal pack
2½	2—1	3 x 3	8	144	Normal pack
2½	2—1	3 x 2	8	120	Pack more loosely than usual
2½	2—1	3 x 2	7	106	Pack more tightly than usual
2½	1—1	4 x 3	7	98	Stalks face centre of case
2½	1—1	4 x 3	6	84	Stalks face centre of case
3	1—1	3 x 3	6	72	Stalks face centre of case
3½	1—1	3 x 2	6	60	Stalks face centre of case



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6 ft.	9	10 0	14	5 0	
7 ft.	10	10 0	15	5 0	
8 ft.	12	10 0	18	10 0	
10 ft.	17	10 0	25	0 0	
12 ft.	23	0 0	31	10 0	
14 ft.	30	0 0	41	0 0	

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The Packing of Oranges

In Dump, Standard and California Cases

Advice on Packing Methods

(By B. P. Krone, Fruit Packing Instructor, Victoria.)

SOME POINTS TO REMEMBER in the packing of Oranges are contained in an article by Mr. Krone, which appeared firstly in the "Journal of Agriculture," Victoria, and was later reprinted. The illustrations are shown by courtesy of the Journal. In addition, Mr. Krone has provided us with a chart showing the various packs advised for the "standard" case.

Harvesting.

If Oranges are to be kept in sound condition for any length of time, too much emphasis cannot be placed upon the importance of careful harvesting, and when being wrapped, each Orange should be handled as carefully as one would treat an egg.

To ensure that the peel is not damaged during these operations, the finger nails of the picker should be clipped closely, and he should wear soft cotton or woollen gloves. When taking the fruit from the tree, it is well to leave a stalk of an inch or so on each fruit, and then with a second cut this piece of stalk may be clipped off close to the "button." This manner of harvesting will be found much cheaper and quicker than removing the stalk in one operation, for it can seldom be done neatly with one cut. With the "single cut" method, small "stubs" are often left on the Oranges, and these cause injuries while the fruit is being placed in the boxes or grading machine.

Shrinkage.

Possibly the greatest bug-bear to the packer of citrus fruit is shrinkage. Even after a short journey, cases may reach their destination as though a layer of fruit were missing. Slack packing, caused by shrinkage, is generally more common in fruit packed whilst still fresh from the tree, and not properly sweated. Slackness may also occur as a result of bad grading. Whatever the reason, a slack case is always discouraging to a buyer.

Curing or Sweating.

Sweating of Oranges, Lemons and Grapefruit makes for good packing, but the economic aspect has also to be considered. Where transportation can be made quickly, as is the case when fruit is sent from the various Victorian citrus areas to the Melbourne markets, sweating is perhaps not essential, and this question must be left to the good judgment of the grower. However, as far as the export trade is concerned, it is a vital necessity that all Washington Navel Oranges be properly sweated before leaving Victoria.

It should be understood that tight packing will not control the slackness that occurs with unsweated fruit; therefore, it is recommended that the Oranges be kept in a well ventilated shed until they have slightly wilted. A week or ten days may be required, or even longer, according to the time of the year and atmospheric conditions. As an Orange wilts, the surplus moisture evaporates from the peel; the cells then are less susceptible to damage, and thus the keeping qualities of the fruit are enhanced. During this process the grower is enabled to detect any specimens that are likely to develop mould, and these should be eliminated when the fruit is being packed.

Sizing.

If a sizing machine is not used, Oranges should be sorted into the following sizes:—

- 2½ inches—not less than 2½ inches, and up to, but not 2½ inches.
- 2½ inches—not less than 2½ inches, and up to, but not 2½ inches.
- 2½ inches—not less than 2½ inches, and up to, but not 3 inches.
- 3 inches—not less than 3 inches, and up to, but not 3½ inches.
- 3½ inches—not less than 3½ inches, and up to, but not 3½ inches.
- 3½ inches—not less than 3½ inches, and up to, but not 3½ inches.

NOTE.—The diameter of the fruit is measured from cheek to cheek, not from the stem to the navel.

Skilled packers generally divide these sizes again, packing the larger of each size into one case and the smaller into another.

Buyers, however, prefer machine-sized Oranges, because with these they are certain of getting the exact sizes and counts they want. An advantage of the machine to growers is that washing, brushing, drying, polishing, etc., which add so much to overhead and handling expenses when done by hand, are done by mechanical means at a fraction of the cost.

The Australian "Dump" Bushel Case.

Inside Measurement 18 x 8-2/3 Inches x 14½ Inches.

Capacity, 2,223 Cubic Inches.

If Oranges are packed on their "cheeks" in the Australian dump bushel case, they will give a more even surface on each layer than when packed with the navels facing upwards.

When packed with navels facing upwards they will perhaps present a level or even surface, but it is usually a false one, for often Oranges of the same diameter will vary a good deal in depth; consequently, the fruit has to be packed much higher than is necessary with the "cheek" method, in order to bring about a similar degree of "snugness."

Many experiments in both processes of packing have been made, and the "cheek" method is the one recommended.

The Correct Height of Fruit in the Cases.

Packing Oranges to the correct height in the case, and the "snugness" of the specimens in each layer are the important features for safe carriage over long distances. Each layer may be packed neatly and "snugly," but if it does not come sufficiently high to permit the lid to hold the complete contents securely, and to prevent the fruit from shaking about in transit, the work is a failure. Therefore, the overcoming of this problem should be foremost in every packer's mind.

Before nailing on the lid, the top layer (no matter of what size the Oranges) should be at least one inch above the top of the case, and never below or just level with it.

There is a little "give" in all packs, and thus the Oranges will be nice and snug when nailed up. Of course, the fruit must not be too high in the case; this will result in damage from over-pressing.

The Various Packs.

The 3-2 Pack.

(Use only for very small Oranges.)

Commence packing by placing an Orange in the left hand corner of the case; another in the right hand corner, and one in the centre. There are thus three Oranges and two spaces. (The fruit should be placed on their "cheeks," and the "buttons" or stem-ends against the end of the case.) In the two spaces pack two more Oranges



Fig. 1.—How to commence the second layer of the 3-2 pack in the Australian Dump Bushel Case. Note.—The Oranges are placed over the "pockets" or spaces formed by the fruit in the layer beneath, not directly on top of them.

which will then produce three spaces. Continue in this manner until the layer is complete. The last Oranges in each layer should be reversed so that the "button" or stem-end will be against the end of the case, and the navel will be protected from rubbing against the wood.

The second and succeeding layers are packed in exactly the same manner, except that the fruit is placed over the spaces or "pockets" caused by the fruit beneath, and does not rest directly on top of the other fruit. Fig. 1 shows how to commence the second layer of the 3-2 pack. Fig. 2 illustrates the finished case of a 3-2 pack with the lid and side removed to indicate the arrangement of the fruit. It will be noticed that no Orange rests directly on top of another.

The 2-2 Pack.

(Use for small, medium, and large Oranges.)

(Special Note.—Most of the commercial sizes should be packed on the 2-2 system.)

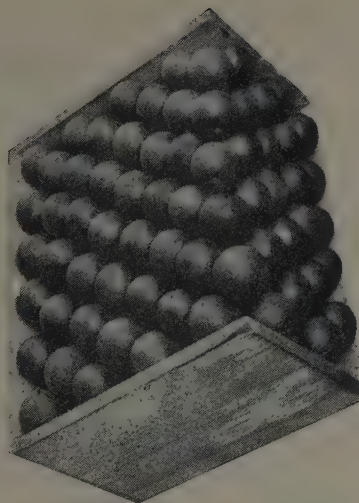


Fig. 2.—Finished case of the 3-2 pack in the Australian Dump Bushel Case. Lid and side have been removed to show arrangement of the fruit. Note.—No single Orange rests directly on top of another.

Commence the 2-2 pack by putting one Orange in the left hand corner of the case on its cheek with the button or stalk against the end of the case. Place another half-

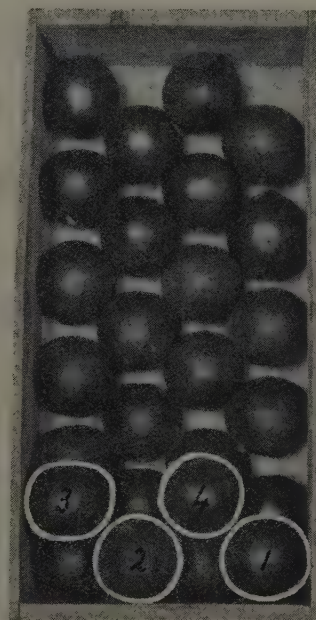


Fig. 3.—How to commence the second layer of the 2-2 pack in the Australian Dump Case. Note.—The Oranges are placed over the "pockets" formed by the fruit in layer beneath, not directly on top of them.

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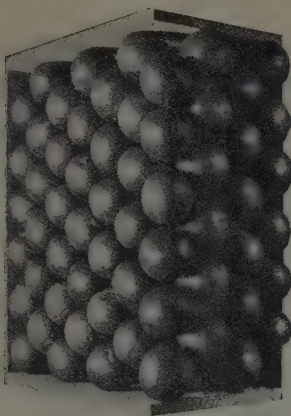


Fig. 4.—Finished case of the 2-2 pack. Lid and side have been removed to show arrangement of the fruit. Note.—No single fruit rests directly on top of another.

way between the first and the side of the case, thus making two equal spaces. In these two spaces pack two more Oranges. Continue packing by placing the Oranges two and two alternately in these spaces until the layer is finished, reverse the last two Oranges in each layer so that the button or stalk will be against the end of the case.

The second and succeeding layers are packed in exactly the same manner as the first, except that the Oranges are placed over the "pockets" or spaces formed by the fruit beneath, and not directly on top of them. Fig. 3 shows how to commence the second layer of the 2-2 pack. Fig. 4 depicts a finished case of the 2-2 pack with the lid and side removed to reveal the arrangement of the fruit.



Fig. 5.—How to commence the second layer of the 2-1 pack in the Australian Dump Bushel Case. Note.—The Oranges are placed over the "pockets" formed by the fruit in layer beneath, not directly on top of them.

The 2-1 Pack.

(Use only for very large fruit.)

Commence by placing the first Orange in the left hand

corner of the case on its cheek with the button or stem end against the end of the case. Put the second in the right hand corner so as to make a space in the middle; in this put another Orange, thus making two spaces. Continue packing first two and then one until the layer is complete. As in the other packs the last Oranges in each layer should be reversed to protect the navels. The second and succeeding layers should not rest directly on top of the fruit beneath, but in the spaces. The method of commencing the second layer is shown in Fig. 5. The finished case of a 2-1 pack with lid and side removed to illustrate the arrangement of the fruit is shown in Fig. 6.

How to Read the Packing Chart.

The "layer" column is the key to the successful packing of most fruits in any size or shape of box. It will enable the packer to surmount those little difficulties which sometimes prevent him from bringing the fruit to the desired height in the box.

The packer with a knowledge of the "layer count" can alter the size of these pockets by packing more tightly or more loosely the fruit in the layer. For instance, if a 2-2 pack with a 6 x 5 layer (this means counting the layer lengthways) be too high in the box, the packer may alter his "layer count" to 5 x 5, which would open the "pockets" a little more, and so reduce the height of the fruit if necessary. If the 5 x 5 layer be tried first and found unsatisfactory, then the 6 x 5 layer should be adopted.

Knowing the number of layers packed in the case, the packer can, by counting the top rows, and referring to the packing chart, tell at a glance the actual count of Oranges in the box. This count should then be stencilled on the box with the other essentials.

Nailing Down.

The manner in which this work is conducted is almost as important as packing the fruit. The following suggestions are made, not only with a view to minimising the risk of bruising, but also to a saving of time.

Sometimes much dumping of a case is resorted to in order to make the fruit "settle down." This is not only a waste of time, but may in some instances seriously damage the fruit.

Nailing down should never be done on a hard or uneven floor. Battens should be placed beneath each end of a case. A lidding-press is a great convenience, and should be in every packing-shed. The pressure that is exerted directly on the fruit is relieved if a case be nailed up on the bare floor. In the lidding-press space is provided beneath the bottom of the case so that with light pressure the fruit can be forced down, and the lid nailed on.

Wire-Strapping of Cases.

Wire-strapping of fruit cases prevents breakages and ullage in transport. It is recommended by railways, shipping, and other authorities; indeed, the Victorian Railways Department will pay claims for ullage and damage to fresh fruit, consigned at "Owner's Risk Rate" if the cases are efficiently strapped with wire. It is, therefore, an insurance to the fruit grower.

Wire-tying is particularly important where softwood cases are concerned, as nails draw more easily from them than they do from those made of hardwood. Thousands of wire-bound cases of fruit are now shipped from Victoria. There is, however, a right and a wrong way of using the wire.

Cases are sometimes forwarded with the wires placed nearly 6 inches in from each end, or may be one wire only, around the centre. Where such cases have even a slight bulge they invariably open up with fruit in the top and bottom layers damaged by the wire pressing on these parts.

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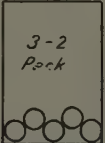

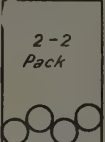

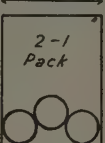

SIZE	PACK.	LAYER.	
Means:— All oranges that actually measure in diameter from cheek to cheek the size stated, and includes all other oranges over this measurement and under the next size.	Means the count across:—	Means the count lengthways:—	
	 3-2 Pack	 6 x 5	<u>LAYER.</u> Means:— The number of LAYERS contained in the box for the pack used.
	 2-2 Pack	 5 x 5	
	 2-1 Pack	 4 x 4	<u>TOTAL.</u> Means:— The total number of oranges contained in the box.

Chart for Dump Bushel Case.
For Local Market.

(18 x 8-2/3 x 14 1/2 inches, inside measurements.)

Size. Inches.	Pack.	Layer.	Lay- ers.	Total.	Remarks.
2 1/4	3-2	6 x 5	9	248	Small (smallest 2 1/4")
2 3/8	3-2	5 x 5	9	225	Pack more loosely than usual.
2-7/16	3-2	5 x 5	8	200	Large (almost 2 3/8")
2-9/16	2-2	7 x 6	7	182	Medium size 2 3/8"
2-11/16	2-2	6 x 6	7	168	Large (almost 2 3/8")
2 1/2	2-2	6 x 5	7	154	
2 5/8	2-2	5 x 5	7	140	
3	2-2	5 x 4	7	126	Smallest 3"
3 1/8	2-2	4 x 4	7	112	
3 1/4	2-2	4 x 4	6	96	Smallest 3 1/4"
3 3/8	2-2	4 x 3	6	84	
3 1/2	2-1	5 x 5	5	75	
3 5/8	2-1	5 x 4	5	68	
3 3/4	2-1	4 x 4	5	60	
3 7/8	2-1	4 x 3	5	53	

Special Note.—Actual measurements of the fruit in many packing experiments prove that the diameter of Oranges in the 200 count is about 2-7/16 inches, and not 2 3/8 inches as commonly supposed; that the 182 count is 2-9/16 inches, not 2 1/2 inches, and the 168 count 2-11/16 inches, instead of 2 1/2 inches. The diameter of Oranges in the other counts increases by 1/8 inch for each count, as shown in the chart.

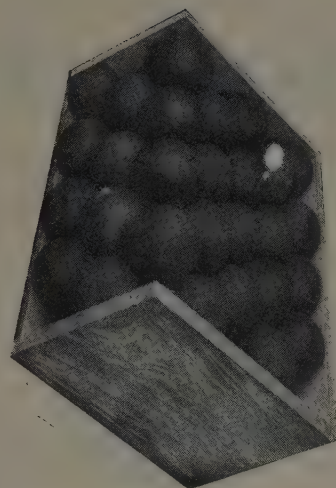


Fig. 6.—Finished case of the 2-1 pack in the Australian Dump Case. The lid and side have been removed to show arrangement of the fruit.

THE CALIFORNIAN ORANGE EXPORT CASE.

(24 x 11 1/2 x 11 1/2 inches inside measurements, clear of the division. Capacity, 3,174 cubic inches.)

Packing.

This type of case is one of the easiest to pack. Not only can all sizes be fitted in it without trouble in their respective packs, but they come to the correct height without difficulty, which is very important.

Cases intended for export of citrus fruit should be so made that there will be a free circulation of air both around and through the cases when stacked. The lathes should be widely spaced, but so arranged that the edges will not cut the Oranges.

The packs employed for this case are known as the 3-3, 3-2, 2-2, and 2-1 diagonal packs. These will provide for all sizes of Oranges, and also Grapefruit.

So far as the exporting of Oranges to London is concerned, it is absolutely imperative that the number of counts be limited to five, namely, 216, 200, 176, 150, and 126. To do this the 3-3 and 3-2 packs only will be employed. It is also recommended that each Orange be packed with the navel facing upwards. Large sized Oranges should not on any account be packed for export; all such fruit should be sold locally.

As soon as the fruit has been packed, it should be pre-cooled without delay at a temperature not lower than 38 deg. nor higher than 42 deg.

Sizing and Grading.

Although Oranges are packed and marketed by counts, it is necessary that the fruit in any case should not vary in size by more than a quarter of an inch.

A good "standard" grade should be aimed at by the packer. To attain this, the fruit selected must be reasonably uniform in shape, color, and texture, and free from

Greetings . . .

From the

N.S.W. Chamber of Fruit and Vegetable Industries



W. MUSGROVE,
Senior Vice-President.



L. J. JENKINS,
President.



P. S. MACDERMOTT,
Secretary.

Goodwill Message

On behalf of my fellow members of the New South Wales Chamber of Fruit and Vegetable Industries, it affords me much pleasure to send "Greetings to all readers of 'Fruit World,'" and I extend to all those connected with our important Industry the best wishes for the festive season, and I hope, as we all do, that the coming year will bring increased prosperity to all concerned.

I am proud to say that since my last message to you, just twelve months ago, the Members of my Chamber have pursued to the utmost the policy of "Service with Integrity" and have on every occasion co-operated with other sections of the Industry in all matters for the improvement of the Industry.

Team work, good faith, honesty of purpose and good feeling are also necessary before full success can be achieved and I offer all these on behalf of my Chamber as our contribution to the work that lies ahead during the coming year.

L. J. JENKINS, President.
The N.S.W. Chamber of Fruit & Vegetable Industries.

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Fig. 8.—How to commence the second layer of the 3-2 pack in the Orange Export Case. Note.—Oranges must not rest directly on top of each other, but in spaces beneath.

prominent or dirty looking markings. The markings should not exceed 10 per cent. of the superficial area of the fruit.

Only sweet, juicy Oranges should be exported. A dry Orange means that the proportion of juice extractable is less than 35 per cent. by weight of the whole Orange. In order to ascertain the proportion of juice obtainable from an Orange, the halves of a freshly divided fruit should be rotated upon a conical glass Lemon-squeezer under hand pressure only. The resultant juice should be strained through a strainer of not less than 30 meshes to the lineal inch.

A mature Orange is one in such condition that the quantity of N/10 soda solution required to neutralise the acidity content of 10 cubic centimeters of juice drawn from the mixed juices of not less than five Oranges taken at random from any case or cases bearing a similar mark shall not be more than—

- (a) 30 cubic centimeters in the case of Oranges intended for shipment to European destinations; and
- (b) 26 cubic centimeters in the case of Oranges intended for shipment to any other destination.

The 3-3 Pack.

Commence by placing one Orange in the left-hand corner of the case with navel facing upwards. Place two others so that they divide the remaining space between this first Orange and the side of the case into three equal spaces. In these pack three more Oranges, and so continue until the layer is finished. The second, and succeeding layers are packed in exactly the same manner as the first, except that each Orange is placed over the "pocket" or space caused by the Oranges beneath. Figure 8 shows how to commence the second layer of the 3-3 pack.

The 3-2 Pack.

Begin packing by placing one Orange in the left-hand corner of the case, another in the right-hand corner, and a third in the centre between these two (three Oranges and two spaces). In the two spaces above pack two more

Oranges so as to produce three spaces, and continue in this manner until the layer is complete, taking care that all navels are facing upwards.

As in all other diagonal packs the second and succeeding layers are packed in exactly the same manner as the first, except that the fruit is placed over the "pocket" or spaces caused by the Oranges beneath, and does not rest directly on top of them.

Figure 9 illustrates a finished case of the 3-2 pack.

Chart for the Californian Orange Export Case.

(24 x 11½ x 11½ inches inside measurements, clear of the division. Capacity, 3,174 cubic inches.)

Size. Inches.	Pack.	Layer.	Layers.	Total.
2½	3-3	4 x 4	6	288
2⅝	3-3	4 x 3	6	252
2¾	3-3	3 x 3	6	216*
2⅞	3-2	4 x 4	5	200*
3	3-2	4 x 3	5	176*
3⅛	3-2	3 x 3	5	150*
3¼	3-2	3 x 2	5	126*
3½	2-2	4 x 3	4	112
3¾	2-2	3 x 3	4	96
3⅞	2-2	3 x 2	4	80
4	2-1	3 x 3	4	72

*Indicates the best selling sizes or counts to pack for export.

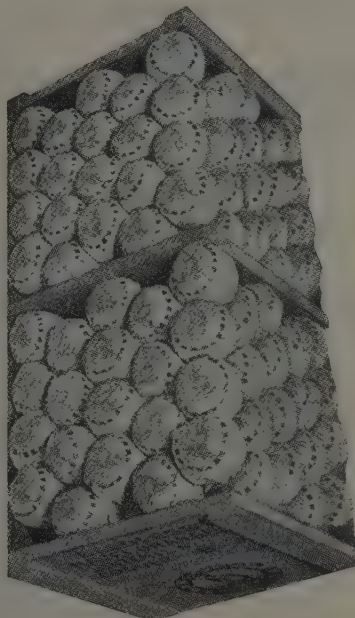


Fig. 9.—Finished case of the 3-2 pack with lid and side removed to show the position of the fruit. (There are 200 Oranges in the case.)

Chart for "Standard" Orange Case.
18 x 11½ x 10½ inches, inside measurements.

Count.	Pack.	Layer.	Layers.	Remarks.
234	3-3	7 x 6	6	Pack more tightly than usual.
216	3-3	6 x 6	6	Normal pack.
198	3-3	6 x 5	6	Pack more loosely than usual.
180	3-3	5 x 5	6	Pack more loosely than usual (2½ inches)
162	3-3	5 x 4	6	Pack more loosely than usual.
150	3-3	5 x 5	5	Pack more tightly than usual
150	3-2	5 x 5	6	Pack more loosely than usual
135	3-3	5 x 4	5	
125	3-2	5 x 5	5	Normal pack (3 inches)
120	3-3	4 x 4	5	
113	3-2	5 x 4	5	Pack more loosely than usual
100	3-2	4 x 4	5	Pack more loosely than usual
88	2-2	6 x 5	4	Pack more tightly than usual
80	2-2	5 x 5	4	Pack more tightly than usual
72	2-2	5 x 4	4	Normal pack
64	2-2	4 x 4	4	Normal pack
56	2-2	4 x 3	4	Pack more loosely than usual
48	2-2	3 x 3	4	Pack more loosely than usual

NOTE.—The "standard" case should never be packed from its side; if this be done confusion of counts will occur in the market.

That the citrus industry cannot place too great emphasis on "quality, grading and packing," is the studied opinion of C. R. Pilkington, of American Fruitgrowers Inc., who states that "just as surely as effect follows cause, so the ability of the grower to obtain the best returns from his efforts hinges upon these three factors: he goes further in saying:—

"Real quality production is possible on the part of every intelligent grower who will honestly make the effort.

"It requires consistent, intelligent, personal application from year to year.

"There is positively no substitute for superior quality and pack in the matter of financial results."

Florida (U.S.A.) produced 28,567,913 boxes of citrus fruits in 1936, valued at £11,000,000, an increase of £2,500,000 over 1935.

Californian shipments of citrus to markets outside of the State declined in 1936 to 43,461 car loads, as compared with 44,933 in 1935. Of the 1936 shipments, Oranges represented 33,012 car loads, Grapefruit 1,824, and Lemons 8,625.

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Sydney ::

The Leading Market for Australia
More Market Space Badly Needed

AUSTRALIA'S LARGEST MARKET for fruit and vegetables is undoubtedly Sydney, the capital city of N.S.W. Sydney has the largest population of any of the Australian cities, nearly 1½ millions, and a huge business is done at the Municipal Markets, and in the streets adjacent to them.

The Fruit Market is bounded by Hay-street, Quay-street, Wheat-road and Ultimo-road, adjoining the Darling Harbor Railway Yards, and covers approximately two acres. There is a railway siding into this market to serve the cold storage works, which is situated in the southern end of the market. There is accommodation in this market for forty-nine stores, and in the centre of the market there are 597 stalls.

There is also a temporary fruit market covering three-quarters of an acre and situated in Burns-street, Factory-street, and Lackey-lane. There is in this market accommodation for 164 stalls.

The manner in which the Municipal Markets have been managed by the Civic Authorities has provided much adverse criticism by those engaged in the fruit and vegetable trade of Sydney. Agents have been particularly candid in their condemnation of the high rents charged for spaces on which to display the products of the orchard and market garden, and the cramped conditions under which they have to work. Some years ago the Civic Authorities promised to make conditions easier by building new markets for the vegetable section in order to relieve the congestion, but very slow progress has been made. For the past year land has been cleared of old buildings, but at the time of writing not a move had been made in the way of re-building. However, it seems that a step in the right direction has at last been made.

Tenders closed on November 26, for the erection of the new Vegetable Markets on the land surrounded by Hay, Harbor, Lackey and Little Pier streets. The land now available by the demolition of buildings in this area is approximately three acres in extent. The buildings will be of brick and cement, and the walls will be tiled.

The cost of the new markets covering the cost of land and buildings will be in the region of £400,000. Modern office accommodation for the staff, refreshment rooms, lavatories, etc., have been provided for, and the new markets should be quite adequate to handle the whole of the vegetable and flower trade. The nurserymen will have a section to themselves, something they have not had before. Previously they had to wait until a section of the vegetable salesmen had cleared off their stocks before they were allowed in the markets. This usually occurred at 11 a.m. The new section for florists will be appreciated by the general public as well as the nurserymen, for the latter will now have a better opportunity to display their flowers, and the buyers will have ample room to move about among the benches.

The State of New South Wales produces all classes of fruit. From the tropical areas come Bananas, Pineapples, Custard Apples, Papaws, Mangoes, etc. From the milder districts come Oranges, Apples, Pears, Cherries, Grapes, Lemons, Passion Fruit Plums, Apricots, Peaches and Tomatoes, while Strawberries and Raspberries grow prolifically in the mountainous districts. In the coastal districts adjacent to the metropolis there has been a big advance in the cultivation of Tomatoes under glass, and there is a constant supply of Tomatoes from this source and tropical areas all the year round.

Large supplies of fruit are sent from other States to the Sydney Market. From the southern Victorian districts, the growers have organised truckloads of Apples and Pears. The trade runs on consistently, from the opening of the season in January and February, and assumes added importance as the year draws on, and quantities are extracted from cool stores.

Tasmania also sends large quantities of Apples and Pears, and in order to maintain and improve this trade, a Tasmanian representative is permanently installed at Sydney Market, whose duty it is to inspect all arrivals of fruit from the Island State, and to closely watch its marketing.



An interior view of a section of the N.S.W. Municipal Fruit Markets.

It is hoped that the congestion shown will be relieved when the new Markets are built.

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N.S.W. Chamber of Fruit and Vegetable Industries

During the past twelve months the N.S.W. Chamber of Fruit and Vegetable Industries has (under the able leadership of Mr. L. J. Jenkins, supported by a capable Council) continued the good work commenced by it in 1935 and has not only supported every movement making for an improvement in the industry, but has also taken the initiative in several directions to bring about better conditions to all engaged in that industry.

The formation by the Chamber of the Fruit Industry Consultative Committee was undoubtedly a step in the right direction, and it can be expected that the activities of his Committee will do a lot towards the more orderly marketing of Interstate fruit on the Sydney market, with benefit to local as well as interstate growers.

The relations between the Tasmanian State Fruit Board organisations in N.S.W., Victoria and Queensland and Western Australia and the Chamber are most cordial, and with all bodies intent on doing everything within their powers to improve present conditions, growers can look to the future with more confidence.

It is confidently expected that cordial relations with South Australia will also be reached in the near future.

The Chamber has also done its part in the direction of obtaining some relief in the matter of the New Zealand Embargo on Australian fresh fruits and sent its Acting Secretary, Mr. P. S. Macdermott, to New Zealand in the latter half of September, 1936.

No opportunity was lost in bringing to the notice of the Federal Government any changes in the situation that might be to Australia's benefit, and the Chamber can justly claim its measure of credit for the quota of 16,000 bushels of Valencia Oranges allowed into New Zealand from Victoria and N.S.W. in December.

Continual pressure has been kept on the City Council for the much-needed improvements in the present Market Buildings, and though no success has as yet been obtained in this direction, efforts will not be relaxed until something is done.

Several Conferences were held during the year with growers' organisation and with the Department of Agriculture, always with the object of improving conditions within the industry, and at present a number of matters are still under discussion, which should come to fruition in the near future.

A bulk loading service at the Sydney end has been efficiently organised, and is available to any growers' organisation which has not a Sydney branch.

This is a non-profit undertaking, and is offered to growers at a small service fee to cover the cost of working.

Several growers' organisations have availed themselves of it during the past year, each one of which expressed their complete satisfaction with the service rendered to them.

Railway and Steamship officers have also co-operated very heartily with the Chamber, and this again has been to the benefit of the industry.

It is a credit to the Executive and Council and must be pleasing to the members to note the high repute in which the Chamber is held, not only by fruitgrowing organisations, but by the Federal and State Governments and the Departmental officers.

The Chamber has certainly endeavoured to live up to the high ideals laid down by its founders and members have only to continue to live up to its motto, "Service with Integrity," to ensure that the good work already done will not only be carried on, but increased, while the standing of this important industry will be lifted to that high plane that it deserves.

The contract for the erection of the new vegetable markets has been given to Messrs. Lipscombe and Price. The price is £77,751, and the building must be completed within nine months. It is expected that a start will be made during January.



An exterior view of the N.S.W. Municipal Fruit Markets, showing location of advertisers in this issue. Note also congestion of traffic.

SYDNEY'S LEADING AGENTS

JOHN JENKINS.

Under the capable guidance of Mr. L. J. Jenkins, Chairman of the N.S.W. Chamber of Fruit and Vegetable Industries, and assisted by Messrs. E. A. and G. E. Jenkins, the old-established firm of John Jenkins is prominent in the marketing of fruit at the Sydney markets. Keen attention to detail, prompt advice of market prices and sales has kept this firm in high favor with growers. Mr. L. J. Jenkins is probably the best-known man in the trade, for his active work in all its branches has kept him in the forefront of every movement for the better marketing of fruit and vegetables.

JAMES SLATER.

This old-established firm of fruit agents is conducted by Mr. Alfred Slater, a son of the founder (James Slater). Ranking among the leading firms at the wholesale markets, where an enormous quantity of fruit is handled, Mr. Alfred Slater has proved an efficient manager in the highly specialised marketing of tropical and other fruits. He is a prominent figure in all matters relating to the trade, and personally supervises all sales of clients' consignments. His weekly cheques are appreciated by growers.

F. CHILTON.

Mr. Fred. Chilton, one of the largest handlers of fruit in Sydney, is held in high esteem by all connected with trade. He is known by growers in every fruit producing centre of the Commonwealth for the capable manner in which his business is conducted. He takes a keen interest in all matters relating to the industry, and his wide ex-

perience has proved a helpful factor in the solution of marketing problems. It is interesting to note that his son, Harry Chilton, is taking an active part in the business, and has already provided evidence of his ability to follow in the footsteps of his able parent.

WALTER MUSGROVE.

Mr. Walter Musgrove, senior Vice-President of the N.S.W. Chamber of Fruit and Vegetable Industry, is an agent whose reputation for integrity is known throughout the trade. From early youth Mr. Musgrove has been engaged in the industry, and is naturally conversant with every aspect of it. He has travelled the orchard country in most States, and knows the growers' problems. He takes a leading part in the affairs of the fruit industry, and his general knowledge has proved invaluable in straightening out the problems that affect the marketing end of the industry.

PRODUCERS' CO-OP. DISTRIBUTING SOCIETY.

Mr. J. W. Blick, manager of the fruit section of the P.D.S., recently returned from a trip abroad, and his article on his impressions of the fruit trade abroad in December "Fruit World" was read with interest. He has always associated himself with every effort for the better marketing of Australian-grown fruit abroad, and his recent trip was not the first he has taken with this object in view. He is on the executive of both the Apple and Pear Export Council and N.S.W. Citrus Packers' Association.

W. J. SINCLAIR.

For over thirty years Mr. W. J. Sinclair has been associated with the fruit trade of Sydney. His stores in Hay-street were recently demolished in order to make way for new vegetable markets and he is now established a short distance away in Lackey-street, where he handles all classes of fruit for growers. Mr. Sinclair has always taken an active part in the affairs of the trade, and was prominent in the recent formation of a new association of agents licensed under the Farm Produce Act of N.S.W.

J. J. MASON.

For the past 20 years Mr. J. J. Mason has been engaged in the fruit trade of Sydney, and has a wide experience of marketing conditions due to his long association with Mr. E. Cooke and his own personal activities during the past four years at his premises in Ultimo-road, one of the best positions at the Sydney markets. He is one of the selling agents for the Banana Board of N.S.W., and handles all other classes of fruit with success, due to his untiring energy and application to the best principles of marketing.

H. P. WOODWARD.

Mr. H. P. Woodward is one of the younger generation of agents, who have come prominently to the fore at the Sydney markets. He has worked up a fine business through steady application to the growers' interest, and his constant endeavours to obtain the best available prices for their products. Growers are reminded that they should label cases sent by steamer with his shipping number, 281. Mr. Woodward will give equal attention to both large and small consignments.

C. GEO. KELLAWAY & SONS LTD.

The firm of C. Geo. Kellaway & Sons Ltd. hold a favorable position at the City Markets, where they distribute all classes of fruit and produce from local and interstate

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orchards. Their good city and country connections, together with the fact that the firm are large exporters, gives them an excellent outlet for all fruits consigned to them.

Mr. Kellaway, senior, has three sons in the business with him, and growers can be satisfied that their interests will always have the personal attention of the firm.

HOPKINS & LIPSCOMBE.

The firm of Hopkins & Lipscombe is an old-established fruit agency business that is controlled by Mr. Stanley G. Pogson, who took charge of the business about twelve years ago at the City Markets. The old firm was established in 1875, in York-street, and later carried on business at the old Fruit Exchange, in Bathurst-street.

When Mr. Pogson took over the business twelve years ago, he had already had twenty-one years' experience of the fruit trade with the firm of F. H. G. Rogers and was thus fully equipped to assume control of a business that needed an energetic man to expand its activities.

Still carrying on under the name of Hopkins & Lipscombe, Mr. Pogson has certainly placed this business on a high level, and has earned the confidence and respect of all connected with the trade. He is highly regarded by growers and agents alike for his unassuming manner and honesty of purpose. He is a member of the fruit section of the Chamber of Commerce and can always be relied on to assist in anything that will make for better relations between grower and agent.

N.S.W. VEGETABLE CROPS.

Principal Acreage and Production.

The figures available give the following information of acreage and production of the principal vegetable crops in N.S.W. as for the year ending June 30, 1935:—

Variety.	Acres.	Production.
Potatoes	19,662	43,033 tons
Tomatoes	2,421	500,794 half cases
Peas (green)	9,497	£72,389 value
Beans (green)	1,695	£27,193 value
Pumpkins and Melons	3,713	12,447 tons

Besides the above, 1,712 acres were engaged in other varieties of commercial vegetable growing, and 6,696 in smaller market and domestic gardens.

Glasshouse Tomato Culture in S.A.

(By N. R. Quinn, Asst. Horticultural Adviser, South Australian Department of Agriculture.)

THE PRODUCTION OF TOMATOES grown under glass in South Australia commenced in about 1908-9. Mr. A. Rosewarne, of Lockleys, was probably one of the first pioneers of the industry. The industry has grown from a few glasshouses to approximately 300 acres under glass, involving a capital cost of approximately £375,000. The annual production is about 250,000 cases, of which approximately 200,000 are exported to the Eastern States.

The most popular varieties consist of the Australian Dwarf Red, Melrose, and Prolific, the Dwarf Red being most popular. Owing to the consistent cross fertilising, quite good strains have been built up by various growers. These are usually referred to under the name of the grower who raised them.

The type of soil preferred by the Tomato is a loose, sandy loam of about 9 to 12 inches in depth overlying a fairly retentive subsoil.

Prior to planting out the young seedlings in the glasshouse, the soil is manured with 1 cwt. of bonedust to each 100 feet of house; some growers use, in addition to this, a heavy dressing of stable manure, the house receiving a covering of three or four inches. The manure is then dug deeply into the soil. Artificial manure is added from time to time to assist with the swelling of the fruits. The usual dressings consist of 30 lbs. of 45 per cent. superphosphate, 10 lbs. of sulphate of potash, 10 lbs. of sulphate of ammonia to each 100 feet of house. The first application takes place soon after the first setting of fruit is noticeably swelling, and each setting is treated accordingly. A heavy watering is given just prior to planting out, and this should carry the young plants for a few weeks during the cool early part of the season.

The first plantings commence in mid-March, and, in a normal season, the early pickings take place in July.

The type of house used most extensively in South Australia measures from 100 to 150 feet in length, 15 feet wide, 6 feet 6 inches at the ridge, and sides 3 feet high. All vertical and horizontal framework of the house is made of wood. The rafters in most instances are made of pressed steel, and houses having steel rafters are considered by most growers to ripen the fruit earlier. In the past, provision for quick, efficient ventilation has been made, but since the introduction of Tomato Leaf Mould into the State, ventilation will become an important factor in glasshouse Tomato culture.

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Melbourne Wholesale Fruit Market

Review of Operations in 1936

Seasonal Prices and Supplies

PRACTICALLY all fruit consumed in the metropolitan area and in the larger country towns is handled by the various wholesale fruit merchants in Melbourne. These agents also distribute the fruit imported from other States, so that the position at the Wholesale Fruit Market may be said to be the position of the fruit trade during any season of the year.

Taking the Melbourne Wholesale Fruit Markets as a whole, millions of cases of fruit are distributed during the year, representing a tremendous turnover, requiring the employment of hundreds of hands, representing an almost incredible volume of cash between the grower and the consumer, and creating that liaison between these two parties that requires expert knowledge and the ability to serve both forces in the efficient distribution of the fruit.

The wholesale agents thus maintain a close and personal contact with grower, retailer and consumer, and probably have a greater and more intimate knowledge of the whole industry than is generally known. They can be, and generally are, factors in maintaining a high standard of quality and their modern facilities for handling distribution ensure that the fruit is put into circulation for consumption with the least possible delay.

The past year, 1936, was on the whole a good one. Many things could have been better and the seasons might have been more defined, but supplies and demand were normal in most lines, and the total turnover was greater than in 1935, whilst the returns obtained were, on the whole, satisfactory. Floods and droughts, frosts and disease, climatic disturbances and other natural conditions at times and in isolated areas caused concern, but the primary producer is so served or harassed by climatic influences that he develops an optimism that is commendable and goes ahead with his job. So varieties and supplies fluctuate and have a bearing upon sales reports and prices, and affect the distribution end considerably.

The following is a brief study of the market position throughout the year, showing wholesale prices by months and a brief record of conditions.

January.

Immediately after Christmas there was the usual lull in sales but, aided by more settled weather, the demand on most lines again increased. Peaches were short-supplied, citrus sales and supplies firm, Pineapple prices eased, Apples firm, local Tomatoes sold well, Peas and Bean prices firmed. Apples, eating 9/- to 12/-; Bananas, green 5/- to 9/-; Grapefruit, 6/- to 14/-; Peaches, 3/- to 7/-; Plums, 4/- to 8/-; Valencias, 8/- to 10/-, specials to 14/-; Lemons to 9/-.

February.

Supplies in all lines back to normal, slightly better than previous year at same month. Weather rather unsettled but on whole a satisfactory month. Rains interfered with picking of citrus in Mildura and affected market. New season Apples appeared, Apricots closed rather poorly, Peaches cleared well for better quality, Grapes appeared at good prices. Apples, eating 4/- to 8/-; Apricots, 5/- to 8/-; Grapes, 10/- to 12/-; Muscats, 16/- to 18/-; Valencias, 6/- to 11/-, specials to 14/-; Peaches, 3/- to 7/-, specials 10/-; Plums, special to 6/-; Cantaloups, 5/- to 7/-.

March.

Little change from February report. Grapes came in strongly and prices dropped accordingly. Oranges were well supplied, but still prices rose, Lemons ditto, Peaches firmed. Apples, eating 4/- to 6/-; Grapes, specials to 10/-, inferior low; Valencias, 5/- to 10/-, selected to 15/-; Lemons, 6/- to 11/-, selected to 13/-; Peaches, 5/- to 8/-, specials to 12/-; Pears, 3/- to 5/-, special Williams to 6/-; Plums, to 6/6.

April.

This was a quiet between-seasons month. Most of trade was in citrus and late Grapes. Valencias heavily supplied, Navels commenced to arrive, but were picked too soon, Grapes finishing, Queensland Mandarins appeared at good prices. Apples, eating 4/- to 7/-; Grapes, 4/- to 11/-; Navels, 12/- to 15/-; Valencias, 4/- to 9/-, selected to



Aerial view of the Melbourne Wholesale Fruit Market showing its spacious lines and up-to-date construction.

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15/-; Mandarins, 10/- to 12/-, specials to 16/-; Pears, 4/- to 7/-; Pineapples, 8/- to 13/-.

May.

Opened up quietly but sales improved as the month advanced, supplies increased beyond requirements in citrus and prices dropped. Apples were quiet, S.A. Celery brought good prices for fair supplies. Pineapples were light, Bananas opened up scarce, but caught up on requirements after middle of month. Apples, eating 4/- to 6/6; Bananas, 14/- to 19/-; Celery, 6/- to 8/-; Grapes, 5/- to 12/-; Mandarins, 8/- to 11/-; Navels, 6/- to 11/-; Pears, 4/- to 7/-; Pines, 10/- to 17/-; Tomatoes, 6/- to 11/-.

June.

Business for the month was better than usual. Apples being scarce brought good prices, Navel supplies were heavy and caused falling market; Banana supplies were light between trains and prices were satisfactory; Queensland Tomatoes arrived green and sales suffered. V.C.C.A. started campaign for citrus consumption with good prospects. Apples, eating 4/- to 6/6; Bananas, 14/- to 19/-; Celery, S.A., 6/- to 8/-, choice higher; Grapefruit, 5/- to 8/-; Mandarins, 7/- to 8/-, specials higher; Navels, 4/6 to 9/-; Pears, 4/- to 7/-; Pines, 8/- to 13/-.

July.

Normal trading rather than the expected increase marked July. S.A. Tomatoes appeared, but were packed too early. All Winter lines steady. Weather conditions slowed up clearances. Good Navels were in demand, S.A. samples on light side owing to export, Grapefruit was slow and poor grades almost unsaleable. Apples, eating 5/- to 7/-; Bananas, green 13/- to 18/-; Celery, S.A. 7/- to 10/-; Grapefruit, 4/- to 8/-; Lemons, 5/- to 7/-; Mandarins, 6/- to 8/-, inferior lower; Navels, 4/6 to 10/-; Pears, 4/- to 7/-; Pines, 8/- to 10/-; S.A. Tomatoes, 15/-; Queensland (repacked) 6/- to 7/-.

August.

Citrus dull during whole of month, too much faulty fruit presented, Oranges quiet, good Grapefruit firm but poor quality hard to quit. Pear sales only fair, Apples steady, Bananas rose last two weeks. W.A. and S.A. Tomatoes opened up green. Apples, eating 5/- to 7/-; Bananas, 11/- to 17/-; S.A. Celery, 7/- to 9/-; Grapefruit, 4/- to 8/-; Lemons, 4/- to 7/-; Mandarins, 5/- to 8/-, few higher, inferior lower; Navels, 4/- to 10/-; Pears, 4/- to 7/-; Pines, 7/- to 9/-; Tomatoes, S.A., 13/-; W.A., 7/- to 9/-.

September.

Business normal during whole month. Navel supplies dropped off, S.A. and Mildura varieties maintained fair prices, Mandarins only large varieties available, Lemons improved, Grapefruit quiet and fair prices. Apples normal, Celery finishing and quality dropping. Asparagus sold well. Pineapple supplies firm. S.A. Tomatoes started well, but Centenary requirements lessened supplies. W.A. Tomatoes green. Apples, eating 5/- to 7/-; Bananas, green 13/- to 19/-; S.A. Celery, 6/- to 9/-, choice higher; Grapefruit, 4/- to 10/- and higher; Lemons, 4/- to 7/-; Navels, 4/6 to 10/-; Pines, 7/- to 9/-.

October.

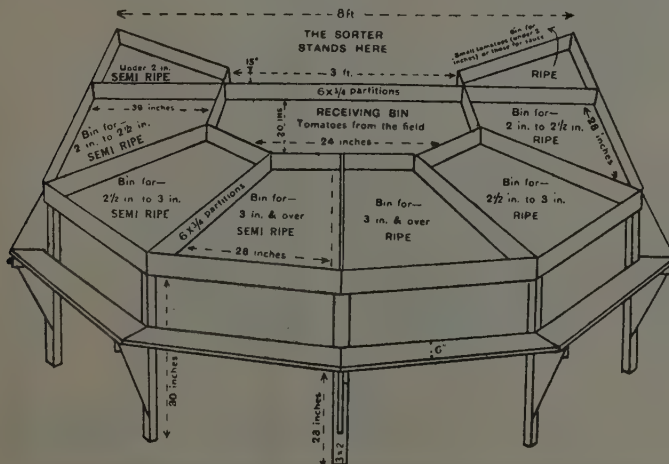
Cherries appeared last week from Young and opened up well to good demand. Mandarins finished, Navels approaching finish with poorer quality. Valencias appeared in good quality. Lemons, good quality firm, but poor quality weak, some too coarse. Apples sold well till last week. Pines sold well in first half, then dropped. Bananas remained unaltered. W.A. Tomatoes arriving on small side. S.A. Tomatoes showed up much better and took control. Prices practically as September.

November.

The long-looked-for warm weather towards the end of the month induced increased sales and also brought on to the market new varieties, especially stone fruits and berries. Drought conditions in N.S.W. and Queensland affected usual supplies from some districts. Prevailing prices were: Apples, eating 6/- to 9/-; Apricots, half cases 8/- to 16/-; Bananas, 7/- to 14/-; Grapefruit, 6/- to 15/-, selected higher; Lemons, 4/- to 7/-; Oranges, Vals. 7/- to 11/-, Common 5/- to 7/-; Pines, 14/- to 20/-, choice to 24/-; Plums, 3/- to 5/-.

December.

During the early half the weather was unsettled, but the Christmas Week saw good weather with big business done. The turnover was normal for the month. Citrus supplies were light throughout and good prices were realised. Brown rot, following humid weather, was experienced in Peaches and Apricots. N.S.W. Bananas appeared in good quantities as Queensland supplies dropped. Nectarines appeared but were hard and too early. N.S.W. Cherries maintained their average supply and arrived in good condition, Victorian samples were indifferent in quality. All berry lines were well supplied and prices were maintained. Christmas volume was about average with other years.



Sketch showing construction of and method of using a useful type of grading and packing bench for Tomatoes.

Illus. courtesy Vic. "Journal of Agriculture."

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Geraldton and District Tomato Growers' Association
(W.A.).
Northern Districts and Geraldton Tomato Growers'
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SPECIAL NOTICE TO FRUITGROWERS

**All Members
under
Fidelity Bond**

In response to numerous requests from growers for information as to who are members of the

Wholesale Fruit Merchants' Association of Victoria

the following list is given. All are members of the above Association, and are registered
firms carrying on business in the

WHOLESALE FRUIT MARKET, MELBOURNE.

STAND NUMBERS ARE AS INDICATED IN PARENTHESES.

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H. L. E. LOVETT & CO. (23).
A. E. PITT (14).
J. DAVIS PTY. LTD. (8).
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Correspondence is invited by the Association.

Office : 21 Wholesale Fruit Market,
Queen Street, Melbourne. Phone F 4866.

Packing Tomatoes

Charts of Methods Recommended

Long Bushel and Half-Dump Cases

In a pamphlet issued by the Victorian Department of Agriculture, the Fruit Packing Instructor, Mr. Basil P. Krone tells how Tomatoes should be packed to conform with the general practice in New South Wales and Victoria so that they will carry, display and open up in the best condition. Packing the fruit to the correct height in the case and giving it the "snugness" which will ensure safe carriage over long distances, he states, is one of the important features of Tomato packing.

Placing Even specimens in each layer, and with no two fruits resting directly on top of each other in any direction in which the case may be placed, is another factor

that will prevent damage and assist in delivering the fruit in perfect condition.

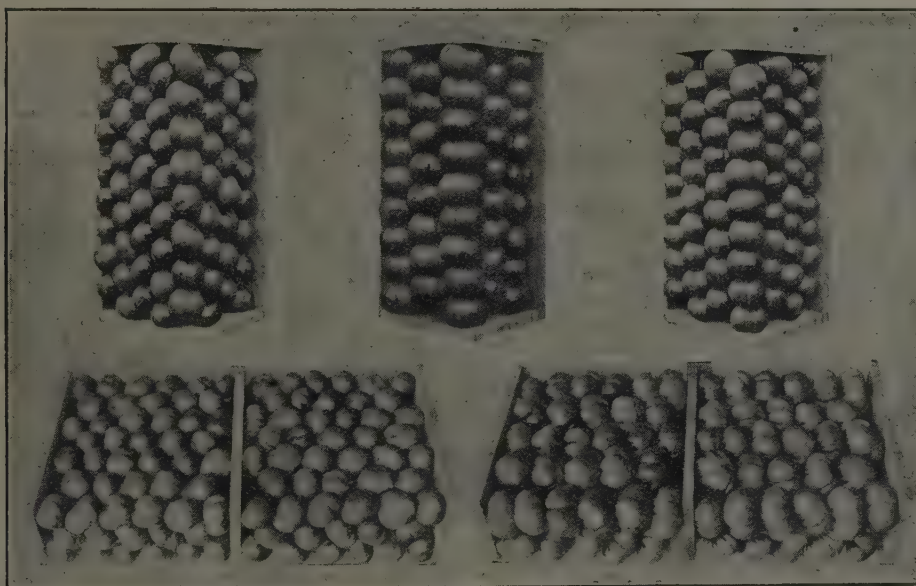
It is the size of the "pockets" or spaces between the individual fruit samples that regulates the height of the fruit in the case and the correct placing of the first layer becomes the most important factor in securing the desired height.

The following charts are what Mr. Krone has prepared for the guidance of packers and represent what are the various packs for both long bushel cases and half-dump cases. The former is the method of packing mostly observed in Victoria, and the latter that more commonly used in South Australia.

Chart I.—For Tomatoes in the "Long" Bushel Case.

(26 inches x 6 inches x 14½ inches, inside measurements, clear of the division.)

Approximate. Size, Inches.	Pack.	Layer.	Layers.	Total.	Remarks.
	2-1	7 x 7	7	294	Angle pack.
2½	2-1	7 x 6	7	274	Angle—small to medium 2½ inches.
	2-1	6 x 6	7	252	Angle—medium to large 2½ inches.
2½	2-1	6 x 5	7	232	Angle—average 2½ inches.
2½	2-1	5 x 5	6	180	Angle—small to medium 2½ inches.
	2-1	5 x 4	6	162	Angle—medium to large 2½ inches.
3	2-1	4 x 4	6	144	Angle—average 3 inches. Pack more loosely than usual. Reverse the first two Tomatoes.
3½	1-1	5 x 5	6	120	Angle—average 3½ inches. Pack more loosely than usual.
3½	1-1	6 x 5	5	110	Angle—small to medium 3½ inches.
	1-1	5 x 5	5	100	Angle—medium to large 3½ inches.
3½	2-1	3 x 3	5	90	Stylar to side—average 3½ inches.



Top row.—Tomatoes packed in the "Half-dump" case. Left, the 3-2 pack, showing the 160 count; centre, the 2-1 pack, showing the 77 count; and right, the 2-2 pack showing the 144 count.

Bottom row.—Tomatoes packed in the "Long Bushel" case. Left, the 2-1 pack, showing the 232 count; and right, the 1-1 pack, showing the 110 count.

Chart II.—For "Half-Dump" Cases Made on the Wide System.

Approximate Size, Inches.	Pack.	Layer.	Layers.	Total.	
	3-2	9 x 9	4	180	
	3-2	9 x 8	4	170	
2½	3-2	8 x 8	4	160	
	3-2	8 x 7	4	150	
2½	3-2	7 x 7	4	140	
	2-2	9 x 9	4	144	Flat
	3-2	7 x 6	4	130*	
	2-2	9 x 8	4	136*	Flat
	3-2	6 x 6	4	120*	
	2-2	8 x 7	4	120*	
	2-2	8 x 8	4	128*	Flat
	2-2	7 x 7	4	112*	
2½	2-2	7 x 6	4	104*	
	2-2	6 x 6	4	96*	
	2-2	8 x 8	3	96	Flat
	2-2	8 x 7	3	90	
	2-2	7 x 7	3	84	
3	2-2	7 x 6	3	78	
	2-1	9 x 8	3	77	Flat
	2-2	6 x 6	3	72	
	2-1	8 x 8	3	72	
3½	2-1	8 x 7	3	68	
	2-1	7 x 7	3	63*	

*Indicates pack more loosely than usual.

The counts shown for Chart No. I, make packing under this method quite as easy as in the packing of Apples. At least eighteen different counts are applicable to Apples, whilst only eleven are ample for Tomatoes. These should be packed not lower than half-inch, nor higher than one inch above the top of the case before the lid is put on. It is advised to pack the Tomatoes at the maximum height and delay the lidding process until the last possible moment.

Other suggestions made by Mr. Krone include the use of white lining paper and new cases. Dirty cases lined with newspaper should be avoided. The fruit should be graded for color and green and colored fruit should not be packed in the same case.

Chart III.—For "Half-Dump" Cases Made on the Narrow System.

Approximate Size, Inches.	Pack.	Layer.	Layers.	Total.
	3-2	7 x 6	6	195*
	2-2	9 x 9	5	180
	2-2	9 x 8	5	170
2½	2-2	8 x 8	5	160
	2-2	8 x 7	5	150
2½	2-2	8 x 7	5	140
	2-2	7 x 6	5	130*
	2-2	6 x 6	5	120*
	2-2	6 x 5	5	110*
2½	2-1	9 x 8	4	102*
	2-1	8 x 8	4	96
	2-1	8 x 7	4	90
	2-1	7 x 7	4	84
3	2-1	7 x 6	4	78
	2-1	6 x 6	4	72
3½	2-1	6 x 5	4	66*
	2-1	5 x 5	4	60*
3½	2-1	6 x 5	3	50

*Indicates pack more loosely than usual.

The diameter of the Tomato is measured from cheek to cheek, not from stem to eye. Slack packing tends to bruise the Tomatoes and squeezing ruptures the inside cells of the fruit, causing early breakdown.

The following definitions apply to Tomatoes:—

Ripe.—The fruit should be two-thirds full colored.

Semi-Ripe.—The fruit should be from one-third full colored.

When marking the cases they should show the brand initials, registered brand or surname, the locality of production, and a description of the size and quality, such as: W. G. Thomas, Echuca, semi-ripe, 3 inches and over.

Charts II. and III. have been designed to cover Tomatoes packed in "half-dump" case, which should measure 18 x 82-3 x 7½ inches, inside measurement. Chart II. is for cases made on the wide system, whilst Chart III. is for cases made on the narrow system.

The illustrations shown explain the packing method advised in the two kinds of cases and a useful grading layout for a packing bench.

Fruit and Vegetables in South Australia

Co-operative Organisation Well Established.

IN MANY RESPECTS the fruitgrowers of South Australia have shown the way in effectively organising the various sections of the industry. Climatic conditions in South Australia are generally favorable, and in many parts of the State the land is eminently suitable for the production of high class fruit and vegetables. Growers have not been slow in exploiting the bountiful gifts provided by nature, and to-day the State has built up a reputation for producing high quality fruit and vegetables, which are not only well and favorably known throughout the Commonwealth, but in many countries overseas as well.

Citrus Production.

Along the Murray Valley is produced the bulk of the citrus production of the State, and it is from this area that the famous "Renmark" Oranges are grown. The Murray Valley Citrus growers are exceptionally well organised, and they are served by the Murray Citrus Association Aust. Co-op. Ltd. This organisation has done wonders during recent years, and by voluntary effort has the support of the big majority of the citrus growers. It was realised some years ago that, with the ever-increasing production of citrus fruits in Australia, the time would

come when the home market could not absorb all the fruit. Consequently, efforts were made to find alternative markets, and although the building up of the export trade, which is in existence to-day, was not without its difficulties, the Association has now placed the export to New Zealand and to Britain on a very sound footing.

All the citrus exported from the State is controlled by the Association, and marketed under one brand—"Riverland." In New Zealand, the Association's representative (Mr. C. Mueller) is in control of the distribution, and it is not alone that his work has made it possible for the expansion of shipments to the Dominion, but he has achieved the enviable result of pleasing the growers, and also the purchasers of the fruit. A few years ago the sceptics scoffed at the idea of ever being able to export citrus to Britain and make it pay, but two years ago the Association grappled with this problem, and, after encountering many difficulties, the export has now been placed on a very sound footing in England, with the result that growers are now very optimistic about being able to considerably increase the exports each year.

In England, the selling and distribution of the fruit is under the control of Mr. N. H. Underwood, who, prior

A. E. PITTMember of Wholesale Fruit Merchants'
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to taking up his present position, was Secretary of the Association for a number of years. The "Riverland" brand of Oranges is becoming very favorably known in the British Isles. In South Australia, citrus is also produced in a number of other districts, such as Salisbury, the Torrens Valley, and the Inman Valley. The growers in these areas are members of the South Australian Fruit-growers' and Market Gardeners' Association, and they participate in the export to New Zealand in conjunction with the Murray Valley growers. Export citrus is subject to rigid inspection in the packing houses, and to-day a very high standard of packing and grading has been achieved.

Tomato Section.

The South Australian Fruitgrowers' and Market Gardeners' Association is an organisation which serves every section of the industry, and for the purpose of efficiency each section manages its own affairs under the guidance of a Central Executive, each section having representatives on this body. The Tomato Section is largely interested in the export of glasshouse Tomatoes to Victoria, and although in recent years the quantities exported have grown tremendously, and the number of growers in the industry have become more numerous, the section has been able to maintain a very high standard of packing, grading and quality of the fruit, which has characterised the product for a number of years.

Celery Section.

South Australian Celery is unsurpassed in Australia, and there has been a steady increase in exports and production during the last five years. The Association has organised and developed markets throughout the Commonwealth, and controls the marketing in Victoria and New South Wales. The Celery Section of the Association is very strong, and growers have received many benefits through the keenness and business acumen displayed by the Section Committee. The Cherry Section has built up a growing trade with Victoria, and also places factory sorts on behalf of the members. The advent of the Section into this field has placed a lot of money into the pockets of growers. Other sections, such as the Soft Fruit Section and the Potato Section, have been formed, and gradually the growers are beginning to realise the absolute necessity of organising. In fact, South Australian fruit and vegetable producers have reached a stage of almost intensive organisation, and all by voluntary effort. The present Secretary of the S.A. Fruitgrowers' and Market Gardeners' Association is Mr. W. J. Kimber, and the President of the Executive Mr. N. T. Hobbs. Mr. Wishart is the Chairman of the Murray Citrus Association (Aust.) Co-op. Ltd. He succeeded Mr. Metters, who was Chairman for a number of years during the developmental stages of the Association.

The South Australian Fruitgrowers' Associations have indeed been fortunate in the executive officers they have chosen, but too much praise cannot be lavished upon the growers, who, at great financial sacrifice, have rendered such magnificent honorary service in the capacity as members of the various committees.

SIX RULES FOR TOMATO GROWING.

The N.S.W. Department of Agriculture Notes advises that the following six rules give best results with Tomatoes:—(1) Choose healthy seedlings; (2) practice crop rotation; (3) raise seedlings with a waterproof cover open to the north-east; (4) avoid over-watering; (5) spray with Bordeaux mixture; (6) burn crop residue at end of season.

Some of the Melbourne Wholesalers

Brief Sketch of Leading Firms.

Operations in the Wholesale Market.

HEREWITH we present "thumb-nail" sketches of some of the established wholesale fruit merchants operating in the Melbourne Metropolitan Fruit Markets. These firms recognise the value of advertising in the "Fruit World and Market Grower" regular monthly issues, and these current sketches bring to readers of the "Annual" a brief story of the development of such firms as a result of their consistent service to growers and retailers alike.

FRANK BOOTH & SONS PTY. LTD.

One of the oldest agents in the markets is Mr. Frank Booth, who started handling fruit nearly 45 years ago when he was on the staff of the Australian Wine and Fruit Company, then situated in Collins-street. That was in the day of sale by auction. After four years with the company he established the present business by buying direct on the orchard and shipping the fruit to Melbourne.

He was later joined by two of his sons, George and James, who now direct the activities of the company. Among the methods of which the company is proud, is the principle of remitting daily payments to their grower-clients.

The company has been operating at No. 16 in the Wholesale Fruit Market since its opening. Every variety of fruit is handled in season and their equipment includes Banana ripening rooms, which are also utilised for ripening Pears and Tomatoes during the early seasons. The plant is so arranged that coloring citrus fruits in ethylene gas chambers is also undertaken when necessary.

Peas and Beans have also a large part in the company's activities and a separate department has been established to handle this special feature.

One of the most notable features of the progress of this firm is the rapid extension of their country order department. In this section country clients are specially catered for, and while this department is in existence it makes a natural outlet for the best quality fruit at full market values.

THE PRODUCERS' CO-OPERATIVE DISTRIBUTING SOCIETY LTD.

The history of the Society is one of expansion and service to its members and clients. In 1925 the Coastal Farmers' Co-operative Society Ltd. amalgamated with the Berrima District Co-operative, of New South Wales, and formed the Producers' Co-operative Distributing Society Ltd., which took over all the activities of the two societies. The Society carried on the Melbourne branch of the fruit and vegetable business in Flinders-lane, and afterwards at the new fruit market in No. 7 Wholesale Fruit Market where they are still situated.

In addition to handling fruit from all States on behalf of its members, the Society returns a bonus of a percentage of its commission charges. Last year a bonus of 10 per cent. was paid, but this year, owing to a profit of £30,539 having been made in the total business of the Society (including butter, cheese, bacon, canned and dried fruits, eggs, poultry, grain and honey), a bonus of 12½ per cent. will be available.

The Society had a turnover of £4,124,032 for the twelve months ending September 30, 1936.

The export business of the Society has grown nicely during the past two years, the shipments to Great Britain being distributed by the Overseas Farmers' Co-operative Federation, London.

Mr. J. McNamara is the manager of the Society's Melbourne business, has been in that position for the past eleven years, and is favorably known to growers and merchants alike.

H. M. WADE & CO.

Mr. H. M. Wade is not only engaged in the wholesale distribution of fruit at No. 21 Wholesale Fruit Market, but also has the honor of being President of the Wholesale Fruit Merchants' Association of Victoria, a position which he ably fills.

Latterly, the relations now fortunately existing between growers, growers' organisations, all Government Departments and others concerned in the industry and the wholesale fruit trade, have been developing, and are now on a much better working basis than ever before, owing to the appreciated and growing co-operation given by all parties.

Practically all interested in the trade are now affiliated with the Wholesale Fruit Merchants' Association of Victoria, and this has made possible a combined voice and justly facilitated dealings and negotiations with the several public bodies.

G. WOOLF & SONS.

Two stores in the Wholesale Fruit Market, No. 29 and 30, are required to do the extensive business of this company. Woolfs is one of the old firms having been operating for over 40 years. The late Mr. Godfrey Woolf estab-

Phone: F 5495.

Private—

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Mr. H. Hyman, Win. 3073.

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WHOLESALE FRUIT & PRODUCE
MERCHANTS

— 51 —

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Melbourne.**

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HANDLE ANY QUANTITY IN A CAPABLE
AND EFFICIENT MANNER.**

PROMPT RETURNS A SPECIALITY.

lished the business, but upon his retirement in 1912 the management devolved upon his two sons with Mr. Isaac (Dick) Woolf in charge.

This firm operates its own orchard at Pakenham, and the equipment includes cool stores with accommodation for 25,000 cases of Apples. In addition to fulfilling the requirements of the orchard, the cool stores are made available for teaching Apple packing to the school children of the district, and it is significant that the Pakenham children have won first place in several packing competitions. The orchard covers an area of 225 acres, mostly in Apple growing.

Associated with the company for nearly 20 years, Mr. T. Huxtable has been a factor in the development of the company's interests.

TIM YOUNG & CO. PTY. LTD.

When the late Mr. Tim Young died some years ago, Mr. William S. Fong took over the responsibility of managing director of the company, and it is largely due to his business experience that the business has been built up to its present flourishing state.

The company ranks amongst the large handlers of citrus fruits and Mr. Fong's personal contact with growers in the Murray and South Australian citrus areas is consistently cultivated.

With premises at No. 18 Metropolitan Wholesale Fruit Market, the company is well equipped to handle all varieties of fruit. Up-to-date ripening rooms, storage space and accessibility are all provided for.

J. DAVIS PTY. LTD.

As managing director of this company, Mr. H. J. (Joe) Davis is well known in the Victoria fruit industry. He represents a business which was established by his father, the late Mr. Joseph Davis in 1882, and has remained in the family ever since. The third generation of the family is represented by his son, Linton J. Davis, who is also active in the business.

Thirty-eight years of close connection with the Melbourne fruit markets ensures for clients the personal attention that contact with this company supplies, and Mr. Davis is equally well known to growers and retailers alike. He realises that these three principals, grower, wholesaler and retailer, are equally responsible in the matter of ensuring for the ultimate consumer the very best fruit available at a reasonable cost.

Mr. Davis is a member of the Wholesale Fruit Merchants' Association, has several times been President, and is rendering excellent service to the industry. His colleague, Mr. R. F. Aldridge, who is in charge of the selling end of the business, has been associated with the company for the past 35 years, and therefore is well known to both growers and retailers.

J. HYMAN & SON.

A firm which has shown remarkable progress in recent years is that of J. Hyman & Son, situated at 51 Wholesale Fruit Market, and at 454 Queen-street, where they have a spacious bulk store and ripening chambers.

The principal, Mr. J. Hyman, is an old identity in the fruit trade, having been in charge for many years at Messrs. Sing War & Co., and later at Tim Young & Co. About eighteen years ago he decided that it was opportune to launch out on his own, and was most successful, being experienced and widely known. About seven years later Mr. H. (Jim) Hyman joined his father, and after having been trained in the sales and executive side of the business was rewarded in 1930 with a partnership.

This progressive firm then began launching out after more direct consignments and extended their field to the Banana districts of N.S. Wales and Queensland. At this juncture Mr. Eck Hyman joined the firm and he immediately proved his worth as a salesman.

The rapid expansion was encouraging to all concerned, and South Australia was proving a further successful venue for business.

Large quantities of mushrooms were handled during last season, and the excellent contacts made proved a great boon to the pickers and canners with whom the firm deals.

During this year a Board was appointed to assist the Banana growers, and Mr. J. Hyman was elected as a member to assist this important industry.

Asked for his opinion on the rapid but steady growth of his firm, Mr. Hyman attributed it to "Mature experience blended with the vigor and persistence of youth and the desire of his staff to at all times give their clients both growers and buyers, that essential of all good business, Service." When asked his opinion on the market to-day, Mr. Hyman was very confident of the future and assured us that if growers watch their packing and grading and co-operate with the agents to market when the public require their produce, no difficulty should be experienced in maintaining payable prices.

A. E. PITT.

First established in Adelaide by the late Mr. A. E. Pitt, about 50 years ago, when the Pitt family was known in the then developing fruit-growing areas, Pitts have extended their sphere of service. The Melbourne business was begun in 1893, and the present proprietor, Mr. A. E. Pitt, after experience in fruit distribution in Adelaide, Melbourne and Sydney, took over personal management in 1925.

Their premises are found at No. 14 Wholesale Fruit Market, and a large business in both local and interstate trade is done. S.A. and W.A. Tomatoes are handled extensively during their seasons and a separate department operates at No. 25 to 28 Victoria Market, in the handling of Peas and Beans.

The handling of Cherries from the Young and Orange districts of New South Wales has increased greatly this season, when the firm handled fully 25 per cent. of all consignments arriving on the Melbourne fruit market.

Mr. Pitt personally supervises the business of his firm as well as giving some time to the Wholesale Fruit Merchants' Association, in which capacity he states that he is convinced that if growers and wholesalers co-operate in distributing only the best quality of fruit that will eventually reach the consumers at reasonable prices, the local consumption must increase, to the benefit of all.

T. STOTT & SONS.

This business was established as far back as 1882 by the late Mr. Thomas Stott. Upon his death in 1925 his three sons carried on the business. Following the family tradition, sons of Mr. H. T. Stott and Mr. H. A. Stott are now in the company and make the third generation of Stotts to serve their many clients in the fruit industry.

Personal management and careful attention to clients' requirements has made a name for Stotts for fair dealing and satisfaction.

The Winter trade in Beans from Queensland and Tweed River District in N.S.W. has been greatly extended by the activities of the company. In addition to the exten-

sive activity in fruit and vegetables, the company has done a large country-order trade throughout Victoria and Tasmania.

HERBERT WILSON PTY. LTD.

With 25 years of practical experience in fruit distribution behind him, Mr. Herbert Wilson, managing director of the above company possesses a knowledge of the fruit business, which was originally begun in the association with his father, the late Mr. H. J. Wilson, who is still remembered for his outstanding business ability.

Their main rooms are situated at No. 10, in the Wholesale Fruit Market, but they also occupy premises at No. 1 Store on the corner of Franklin and Peel streets, mainly used as ripening rooms and selling floor for Bananas, of which large quantities are handled. This latter department is in the capable hands of Mr. F. W. Smith who has had experience in handling Bananas over the past forty years.

A co-director is Mr. Hyman Grinblat, who is largely responsible for the distribution end of the business and has been with the company for about six years.

GEORGE LISTER PTY. LTD.

Mr. J. R. Vail acquired control of the above company in 1927, and still operates under the trade name of Geo. Lister Pty. Ltd., at the Metropolitan Wholesale Fruit Market. With experience in fruit marketing in many countries, Mr. Vail has been able to compare both production and marketing methods to advantage.

After seven years' experience in wholesale fruit marketing in London, he was general manager for Messrs. Samuel Larkinson Ltd., in Covent Garden before coming to Australia, so that he may be quoted as well founded in general marketing principles.

One of Mr. Vail's convictions is that good fruit is welcomed by the public, that quality tells in every case, and that consumption increases with a corresponding and uniform quality. His firm has been built upon a reputation for service to all parties and is an accredited agent for almost every growers' organisation in Australia. He is a director of the Wholesale Fruit Merchants' Association, as well as a director of the Victoria Mark Fruit Company.

Mr. Cecil Vail, his brother, is associated with him on the sales end of the business, and the business is wholly directed by their guidance.

F. CAVE & CO. PTY. LTD.

When "Fred" Cave arrived in Australia from England away back in 1913, after experience in the handling of fruit in that country, he accepted his first and only position in Australia, other than as head of his own company, with the Coastal Farmers' Co-operative Society Ltd., now the Producers' Co-operative Distributing Society.

With a wealth of knowledge of the fruit business, Mr. Cave continues to serve his numerous clients, both growers and retailers in a happy and successful manner. He is also the Victorian representative of the well-known London firm of fruit handlers, J. O. Sims Ltd.

Mr. Cave is removing his business premises from the Wholesale Fruit Markets, to 391 Flinders-street, Melbourne, but is not retiring from the Wholesale fruit trade. At the new address he hopes to carry on in a more effective manner his firm belief that there is a ready market for guaranteed packs of quality fruits.

In addition to developing a large business in the local fruit trade, Mr. Cave has successfully launched a subsidiary business, Caves Pure Fruit Drinks Ltd., aiming to create a larger use of fresh fruit and to educate the public in the consumption of pure fruit drinks. He claims that the manufacture of by-products from fruit is conferring a definite benefit upon the industry, and advocates, with a strong logical argument, that the grower's profit lies in his low-grade fruit, which not only is valuable for use in by-products, but relieves the market

for better reception of the higher quality fruit, and the success of this venture in absorbing large quantities of what might be termed reject fruit is seen in the efficient factory now operating in Dynon-road, South Kensington.

Mr. Cave is on the executive of the Fruit Marketing Association of Victoria, and is working assiduously to increase local consumption of fruit in Victoria.

THE PORT OF HULL.

SITUATED on the North Bank of the Humber, Hull attained a place of high importance as a port early in the twelfth century, since when it has consistently played a great part in Britain's trade. The natural advantages of the port, its extensive facilities, and the progressive policy adopted by the dock and port authorities, have secured its continued prosperity, so that for many years it has ranked as the third port in the United Kingdom. Its position in relation to the vast populous industrial areas of the hinterland, and its unrivalled railway communications, have combined to make it an ideal centre for the import and export of merchandise from and to all parts of the world.

As nearly one-third of the population of Great Britain is economically served through Hull, the advantages of that port will be clearly evident to those interested in trade with the United Kingdom.

The port not only holds an eminent place in the trade of Great Britain, but it is the most convenient for the continental trade. Its geographical position and the splendid steamship services make it the ideal centre for the transhipment and re-export of goods to Scandinavian, Baltic and all near continental ports.

The London and North-Eastern Railway maintain rapid and efficient services by fast freight trains to all parts of the country, giving delivery in the principal towns on the day following despatch.

The docks at Hull are owned solely by the London and North-Eastern Railway Company, who have spared no effort in providing ample up-to-date equipment, and the port is able therefore to cater for the largest cargo vessels sailing to and from all parts of the world. There are ten docks with a water area of 210 acres, two riverside quays, and two oil jetties at which can be accommodated the largest oil tankers afloat. The total length of the quays available is 12 miles, and there are about 300 miles of standard gauge railway lines in and around the docks. The port possesses ample storage accommodation, which includes warehouses capable of holding 207,000 tons of goods, wool sheds with space for 140,000 bales of wool, cold stores with 700,000 cubic feet of space, and a grain silo with a capacity of 40,000 tons.

In Great Britain the port is the natural gateway to the immense industrial areas of the North and Midlands, and more than 13,000,000 people (almost one-third of the total population) live within the territory most economically served by it.

Fruit from overseas countries is dealt with mainly at the King George Dock, which is one of the most modern in the country, or at Alexandra Dock.

No effort is spared to ensure rapid discharge and despatch by the express trains provided by the London and North-Eastern Railway.

Buyers have free access to the docks and quays for the inspection of fruit before and after the sales, which are held regularly each Monday, Wednesday, and Thursday, and at other times as required. These sales are largely attended by the principal buyers from the industrial centres of England and Scotland and parts of Ireland.

A large number of the most important firms of fruit brokers and importers are resident in Hull, many of whom specialise in the export trade and are in close touch with Scandinavian, Baltic, and all near continental ports.

FROST PREVENTION

(Contributed.)

Frost Areas.

THE INCIDENCE OF FROSTS depends to some extent on the local conditions and the topography of the surrounding country: all parts of Victoria are subject to frost, but certain areas suffer much more than others.

In general low lying land and hollows are likely to experience lower temperatures than higher ground, owing to the drainage of cold air to these parts: thus it is sometimes found that on a sloping piece of ground, the lower levels will be affected, and above a certain well-defined mark no signs of frost are noticed. For the same reason, a barrier of trees or undergrowth may retard the flow of cold air and cause low temperatures which might be avoided if the barrier were removed. It is known that the condition of the soil is also of importance, but authoritative information on this point is not yet available.

Frost Damage.

There will always be certain areas subjected to frost danger, however, and since no insurance company will carry the risk, the grower must take steps to protect himself against loss. It is well known that a whole crop may be destroyed within an hour or so, but this is not the end of the damage, since the tree or vine suffers a definite injury from which it does not recover for several seasons; thus more than one crop may be affected by a severe frost.

History.

In Europe some form of artificial heating has been practised for very many years, but without much knowledge of the scientific principles involved, and it was not until the matter was investigated in California that a really successful method was developed. In Australia, the whole idea of frost prevention is still new, and although experience in other countries is valuable, a system has to be evolved which will be suitable not only to the particular climatic conditions encountered, but also having in mind the kind of fuels available and their relative costs.

Smudging.

The first development was to use the smudging system whereby a smoke screen is created over the plants in an endeavor to prevent loss of heat from the earth. Experiments with smudging on a large scale were carried out in 1932 by the Lights Pass Frost Fighting Committee, but were a complete failure owing to wind drifts carrying the smoke away; this is an inherent disadvantage of this method which will always make it a very uncertain means of prevention and, in addition, even if the air is perfectly still, only a very light frost of about 2 deg. F. could be dealt with. This is not sufficient protection for the frosts experienced in the Murray Valley and other parts of Victoria, and the system of direct heating offers the only satisfactory solution.

Direct Heating.

The theory of direct heating is now well understood, and it is recognised to be a perfectly practicable and effective method. The temperature of the air from the ground up to a height of 20-25 ft. can be raised to a safe temperature by means of small fires which burn without smoking; the only questions to be decided are concerned with establishing the minimum amount of heat required and the kind of fuel to be burned.

Heaters per Acre.

In some experiments with fuel oil made by the Chief Horticultural Instructor of South Australia, Mr. J. B.

Harris, in 1932, the conclusion was arrived at that the number of oil pots should be from 80-100 per acre. Many growers with practical experience of oil heating consider this figure to be too high, and a recent A.D.F.A. Conference in Mildura recommended 60 heaters to the acre; on all the evidence available, this figure seems to be the minimum which could be used with safety.

From investigations made with Yallourn briquettes as fuel, it has been found that 50 heaters to the acre are quite sufficient to give a uniform heat distribution. Tests have also shown that this number is certainly sufficient to give the temperature rise required for any frost likely to be experienced in Australia.

Time of Lighting.

Accurate information as to the minimum safe temperature which various plants will stand without damage, is not yet available. The C.S.I.R. is enquiring into the matter, but, meanwhile, it may be taken as safe practice to light up the heaters when the temperature has dropped to 32 deg. F. with indications of a further fall.

The length of the burning period will vary with the type of plant to be protected. For instance, with vines, four hours is normally a sufficient time, but citrus may require protection for six-seven hours.

Choice of Fuel.

As regards the choice of fuel, there is no question but that in Victoria either fuel oil or Yallourn briquettes must be used. Apart from the national benefit to be gained by using a fuel which is produced in abundant quantities in this State as against an imported product, the matter should be determined on the basis of cost and convenience. There seems to be little advantage for either fuel as regards handling, if anything, briquettes are a little cleaner than oil, and once the pots are filled, there is no further loss through leakage with briquettes as there may be with oil in the average type of heater employed. One advantage with oil, however, is that if after the heaters are lighted, it is found that the frost conditions are not further developing, the heater can be readily extinguished, whereas with briquettes this is not so readily accomplished; this, however, is not such an important point as it may seem since, in the first place, with modern methods of frost prediction, there should seldom be any occasion when the heaters are lighted unnecessarily, and secondly, if the oil heaters were allowed to burn for only 1½ hours, the cost would be equal to burning the whole of the contents of a briquette heater. The lighting of heaters, either oil or briquettes, is very easily and quickly accomplished, and offers no difficulty.

Rate of Burning.

The rate of burning will depend on the surrounding air temperature, but for normal frost conditions, an average heat release of about 2,500,000 B.T.U. per acre per hour should be sufficient; this corresponds to a fuel consumption of approximately 300 lbs. briquettes or 20 gallons of oil per acre per hour, allowing for the efficiency of combustion.

Thus in a test with briquettes carried out by Mr. D. D. Brown, of the Victorian Agricultural Department in a vineyard at Beverford, in September, 1936, using 50 heaters per acre, the average rate of burning over a period of three hours, was about 275 lbs. per acre per hour for an average temperature difference of 3½ deg. F. Similarly, in a briquette test in a citrus grove at Murra-

bit, conducted by the Agricultural Department in July, 1934, fuel was burned at an average rate of 270 lbs. per acre per hour for a period of 4½ hours, and an average temperature difference of about 4½ deg. F. was maintained.

In a test with oil heaters at Lights Pass by the South Australian Agricultural Department in October, 1933, an average temperature difference of about 6 deg. F. was maintained for 3½ hours with a fuel consumption of about 30 gallons per acre per hour; and at the Merbein Research Station of the C.S.I.R. in 1936, an average difference of about 2 deg. F. was obtained for an average oil consumption of approximately 10 gallons per acre per hour.

It should be clearly understood that during all the above tests, the temperature difference at times was considerably greater than the average figure given; for example, in the briquette trial at Murrabit a maximum difference of 7 deg. F. was registered. This maximum difference, however, is not the important factor, since to raise the temperature much above the safety limit of 32 deg. F. is merely wasting fuel; it demonstrates, however, that the temperature difference obtained is a function of the rate of burning fuel and can be increased as required, by increasing the amount of fuel used.

Depreciation.

A further point to be considered is the initial outlay on the heaters and their anticipated life. Oil heaters are cheaper, costing somewhere about 2/- each, whereas bri-

quette heaters are about 5/6 each. The rate of depreciation on the latter, however, is much lower, and given reasonable care they may be expected to have a life of at least ten years, or 150 burning hours, whereas five years with the oil heaters would be exceptionally good.

Cost.

In comparing the cost of the two fuels, there is some variation of prices in various parts of the State, but the difference is everywhere most marked; the following table shows a typical comparison for the Redcliffs district for an area of one acre:—

Kind of Fuel.	Heat value B.T.U.'s per lb.	Price on site.	Cost per 10° B.T.U.	Quantity used per hr.	Total fuel cost per hr.	Depn. Cost per hr.	Total cost per hour.
Briquettes	9,500	40/- ton	1/10	300 lbs.	5/4	1/10	7/2
Oil . . .	18,500	8d. gall.	4/-	20 gall.	13/4	1/7	14/11

Conclusion.

To sum up, it may be stated that some form of direct heating is necessary for certain known frost areas of the State. Either Yallourn briquettes or oil in special heaters may be used, and that briquettes show the lowest cost.

Fruitgrowers' Associations Throughout Australia

THE AUSTRALIAN APPLE AND PEAR EXPORT COUNCIL.

President: J. B. Mills, 528 Collins-street, Melbourne; Vice-President, L. S. Taylor, Exeter, Tasmania; Secretary, R. E. Boardman, A.F.I.A., F.A.I.S., 528 Collins-street, Melbourne.

Affiliated Associations—
Tasmania: Tas. State Fruit Board, Tas. Fruit Shippers' Committee, N. Tas. Fruit Shippers' Committee.

Victoria: Victorian Fruit Marketing Association.

S. Australia: S. Aust. Fruit Marketing Association.

W. Australia: W.A. Fruitgrowers' Association, W.A. Fruit Shippers' Committee.

New South Wales: N.S.W. Apple and Pear Export Association.

Queensland: Committee of Direction of Fruit Marketing.

Australian Dried Fruits Association: Sec., W. N. Sumner, Cornhill Chambers, Collins-street, Melbourne.

Dried Fruits Export Control Board: Sec., R. A. Marx, 100 Queen-street, Melbourne.

Canned Fruit Export Control Board: Sec., W. J. Adams, A.M.P. Buildings, Collins-street, Melbourne.

Federal Citrus Council: Sec., A. W. Schwennessen, Temple Court, Collins-street, Melbourne.

NEW SOUTH WALES.

Fruitgrowers' Federation of N.S.W.—Secretary, E. E. Herrod, 11 Bligh-street, Sydney.

List of Affiliated Organisations, Together with Names and Addresses of Secretaries.

Arcadia: E. L. Alexander, Arcadia, via Galston.

Annangrove: E. R. Langlands, Bona Vista, Annangrove.

Arding: J. H. Yeomans, Arding, via Uralla.

Armidale and Dist.: W. Gantle, "Dangarsleigh," Armidale.

Aylmerton (A.B.C.): L. C. Owen, Wandilla, Alpine.

Banana Growers' Fed. Co-op. Ltd.: A. Buckley, Box 31, Murwillumbah.

Bathurst: E. Ray, O'Connell-road, Bathurst.

Batlow: Agric. Bureau, J. E. Dodds, "Greenlands," Batlow.

Batlow Packing House and Cool Stores Rural Co-op. Soc. Ltd., Batlow.

Berrima and Dist.: H. Richardson, Moss Vale.

Binalong: W. Arthur, Binalong.

Brady's Gully: J. D. Kirkness, Brady's Gully, via Gosford.

Bulga: L. C. Dodds, "Glenanne," Bulga.

Bungunyah and Koraleigh: J. Swan, Koraleigh P.O. (N.S.W.), via Nyah (Vic.).

Buninyong: C. J. Rowcliff, Old Dubbo-road, Dubbo.

Camden: G. V. Sidman, Camden.

Cattai Dist.: N. G. Baur, Box 1, P.O., Windsor.

Central Nth. Coast Tomato, Fruit and Veg. Co-op. Soc. Ltd.; A. G. Henderson, Valla.

Cessnock and Dist.: R. McNamara, Mt. View, via Cessnock.

Coff's Harbor: V. E. Allen, "Korora," Coff's Harbor.

Coomealla: C. Aubrey Calf, Dareton.

Cordeaux: F. A. March, Cordeaux River, Kambla Heights.

Crookwell: A. G. McDonald, Crookwell.

Curlwaa: R. S. Thornton, Curlwaa.

Dooralong: S. C. Richards, Dooralong, via Wyong.

Dural: R. Badger, Dural.

East Kurrajong: E. Case, Kurrajong.

Elderslie: A. F. Pankhurst, Elderslie, Braxnton.

Exeter: P. C. Allen, Sutton Forest.

Fairfield and Dist.: G. Lehmann, Water-street, Smithfield.

Freeman's Reach-Glossodia: A. Krahe, Wilberforce.

Glenfield: A. J. Blinman, Glenfield.

Glenorie: W. M. Jamieson, Boronia-road, Glenorie.

Glossodia: R. J. Jenkins, Glossodia, via Windsor.

Gosford Co-op. Citrus Packing House Ltd.: W. W. Challis, Box 10, Gosford.

Gosford Bulk Loading Rural Co-op. Society Ltd.: L. S. Dubois, Railway Goods Yard, Gosford.

Goulburn: T. Higgins, Box 116, Goulburn.

Grafton Dist.: B. C. Eggins, "Melrose," Kent-street, Grafton.

Gressford: G. N. Doyle, East Gosford.

Griffith Prod. Co-op. Co. Ltd.: Box 476, Griffith.

Grose Vale: J. F. Power, Grose Vale.

Grose Wold: H. C. Matheson, "Glenara," Grose Wold.

Gunning: G. E. Ardill, Gunning.

Holgate: R. Gale, Holgate, via Gosford.

Hawkesbury and Nepean Fed. of Progress Assns.: H. C. Matheson, "Glenara," Grose Wold.

Hunter River and Dist.: W. Howarth, Lorn, West Maitland.

Inverell: W. Ayland, Box 218, Inverell.

Kellyville: A. Bathgate, Kellyville.

Kenthurst: W. E. Campbell, Kenthurst.

Kentucky Agric. Bureau, Co-op. Packing House Ltd., D. J. Toomey, Kentucky.

Kentucky Rural Co-op. Soc. Ltd.: Kentucky South.

Kentucky F.G.A.: J. Ballantyne, Hillcrest, Kentucky South.

Kincumber and Avoca: D. F. Gray, Avoca Beach, via Gosford.

Kingsvale Rural Co-op. Soc. Ltd., Box 5, Young.

Kootingal: Mrs. B. M. Sage, Kootingal.

Kulnura: L. Lundie-Jenkins, "The Lookout," Kulnura, via Gosford.

Kurrajong: A. F. Vincent, Kurrajong.

Lavington: W. Hanna, Lavington.

Lemon Growers' Assn.: R. W. Bennett, Mangrove Mt., via Gosford.

Liverpool and Dist.: A. L. Marshall, Central-avenue, Chipping Norton.

Lower Portland: H. Lowe, Lower Portland.

Maidens Brush: J. Rosa, Whitton-street, Gosford.

Mangrove Mt.: A. E. Lillicrap, Mangrove Mt., via Gosford.

Maraylya and Dist.: A. Wimble, Maraylya.

March Agric. Bureau: N. Griffith, "Melyra," March, via Orange.

March Fruit Growers' Association: E. Griffith, March, via Orange.

Mardi: L. T. Bray, Mardi, via Wyong.

Maroota: G. Bowie, Maroota, via Windsor.

Matcham: S. C. Aldridge, Roadside

Mail, Oak-road, Matcham, via Gosford.

Maimuru Rural Co-op. Soc. Ltd.: R. Job, Lhuddungra-road, Young.

Millthorpe: W. W. Moad, "Merlyn," Millthorpe.

Mitchell's Flat: G. Ernst, Mitchell's Flat, via Singleton.

Mt. Hunter: J. Childs, Mt. Hunter, via Camden.

Morisset and District: G. W. Brown, "Wonga Hill," Martinsville.

Molong: E. L. M. Parslow, Box 35, Molong.

Mt. Wilson and Mt. Irvine: G. Valder (Jnr.), "Noonoo," Mt. Wilson.

Mudgee: E. W. Roth, "Putta Bucca," Mudgee.

Narara: A. M. Midson, Deane-street, Narara.

Newcastle Dist.: A. Barrett, Cardiff.

Niagara Park: T. H. B. Cassell, Niagara Park, via Gosford.

Nepean Dist. F.G.A.: M. G. Walker, Emu Plains.

Nepean Dist. A.H. and I. Society: C. H. Fulton, Box 17, Penrith.

Nullamanna: R. E. Gearing, Nullamanna.

North Richmond: R. D. Turnbull, North Richmond.

Oakville: W. H. Midson, Oakville, via Riverstone.

Oakdale: H. S. Kingsell, Oakdale.

Orange Prod. Rural Co-op. Soc. Ltd., Box 171, Orange.

Orangeville: G. N. Mackie, Orangeville, via Camden.

Orchard Hills and Dist.: K. Basedow, Orchard Hills.

Ourimbah Bulk Loading Rural Co-op. Soc. Ltd.: H. Freeburn, Ourimbah.

Parkesbourne: G. Brown, Parkesbourne.

Pennant Hills: H. B. Chisholme, New Line-road, West Pennant Hills.

Peats Ridge: A. J. Love, Peats Ridge, via Gosford.

Penrose Agric. Bureau: C. Hebblewhite, Penrose.

Penrose Fruitgrowers' Rural Co-op. Soc. Ltd.: J. E. Tickner, Penrose.

Pitt Town: W. Snape, Pitt Town, via Windsor.

Producers' Co-op. Distrib. Soc. Ltd. (Fruit Section): Box 86c, P.O., Haymarket.

Running Stream: E. Bartlett, "Melrose," Capertee.

Saratoga: J. J. Bourke, Saratoga.

Sackville North: S. N. Mitchell, Sackville North, via Windsor.

Shipley: R. S. Longton, Shipley, via Blackheath.

Singleton: A. J. Taylor, Warkworth, via Singleton.

Somersby: D. K. Hutchinson, Somersby, via Gosford.

St. Ives: G. A. Hunt, Kenthurst-street, St. Ives.

Tahmoor: A. G. Miller, Tahmoor.

Tallong: H. Kettle, Tallong.

Tenterfield and Dist. Chamber of Commerce (Fruit Section), Tenterfield.

Terrigal: A. Bassan, Terrigal.

Tuggerah: F. C. Fripp, Tuggerah.

Tumbi Umbi and Dist.: A. L. Bohringer, Tumbi Umbi, via Wyong.

Upper Colo: J. E. Forgham, Upper Colo.

Uralla: W. D. Goode, Spring Creek, Arding, via Uralla.

Warkworth: J. Greenhalgh, Warkworth, via Singleton.

Warner's Bay Dist.: A. J. Weiklejohn, Spear's Point, via Boolaroo.

Waterview Rural Co-op. Soc. Ltd., c/o T. Steele, Box 54, Young.

Wedderburn: R. F. Arundel, Wedderburn, via Campbelltown.

West Gosford: A. E. Walker, Manns-road, Gosford.

Wilberforce: P. Bushell, Wilberforce.

Wingello: C. Nurse, Fruit Section, Wingello.

Wirimah Rural Co-op. Soc. Ltd., Wirimah, via Bendick Murrell.

Woonona and Dist.: F. Turnbull, York-road, Bellambi.

Wiseman's Ferry and Dist.: C. Riley, "Wanatta," Wiseman's Ferry.

Wyoming: R. W. Haynes, "Lynhales," Narara.

Wyong Co-op. Citrus Packing House Ltd., Wyong.

Yarramundi Falls: A. P. Lusecombe, Agnes Banks.

Yass: Yass.

Yarramalong: A. G. Waters, Yarramalong.

Yenda Producers' Co-op. Soc. Ltd., Box 19, Yenda.

Young Cool Stores Rural Co-op. Soc. Ltd., Box 5, Young.

Young Fruitgrowers' Co-op. Soc. Ltd., Box 5, Young.

Young Dist. Producers' Co-op. Assn. Ltd., Box 5, Young.

N.S.W. CITRUSGROWERS' DEFENCE ASSOCIATION.

Branches and Affiliated Associations.

Tumbi Umbi.

Long Jetty.

The Entrance, Tuggerah.

Sackville North.

Galston and Hornsby.

Hawkesbury District Citrusgrowers' Association (affiliated).

Batlow.

Jillibi & Wyong.

Narara.

Yoogali.

Ebenezer.

Grafton.

Moorland Fruitgrowers' Association (affiliated).

Mangrove Mountain.
Arcadia.
Gosford.
Armida.
Middle Dural.
Glenorie.
Wamberal.
Lisarow.
Ourimbah.
Griffith.
Kentucky Fruitgrowers' Defence Association (affiliated).
Blaxlands Ridge.
Leeton.

FRUITGROWERS' ASSOCIATIONS IN VICTORIA.

Bairnsdale Fruitgrowers' Association (R. C. Matthews, Bairnsdale).
Bunyip, Garfield and Tynong Fruitgrowers' Association, Bunyip.
Burwood East Fruitgrowers' Association (G. C. Karnaghan, Blackburn).
Croydon Horticultural Association (R. P. Menzies, Croydon).
Doncaster Fruitgrowers' Association (G. S. Grover, Doncaster).
Diamond Creek Fruitgrowers' Association (R. M. Finlay, Diamond Creek).

Drouin and Warragul Fruitgrowers' Association (C. P. Nobelius, Warragul).

Dunolly and District Fruitgrowers' Association, Betley.

Gippsland Fruit Marketing Association (W. H. Carne, Pakenham Upper).

Gorae Fruitgrowers' Association, Gorae, via Portland.

Harcourt Fruitgrowers' Progress Association Ltd. (C. Hull, Harcourt).

Harcourt Fruit Supply Company (C. Wilson, Harcourt).

Northern Victoria Fruitgrowers' Association (S. P. Cornish, Ardmuna).

Orchardists' and Fruit Cool Stores' Association of Victoria (H. J. Noonan, Mitcham-road, Donvale).

Panton Hill Fruitgrowers' Association, Panton Hill.

Quantong Fruitgrowers' Association (C. H. Jost, Quantong).

Somerville Fruitgrowers' Association (A. F. Telford, Somerville).

Southern Fruitgrowers' Association (J. W. Aspinall, Box Hill).

Shepparton Irrigators' Association, Shepparton.

Silvan Fruitgrowers' Association, Silvan.

Strathfieldsaye Fruitgrowers' Association, Strathfieldsaye.

Tyabb Fruitgrowers' Association, Tyabb.

United Berry Growers' Association (J. M. Mitchell, Wandin).

Victorian Central Citrus Association, A. W. Schwennessen, manager, 360 Collins-street, Melbourne.

Victorian Fruit Marketing Association (R. E. Boardman, A.F.I.A., 528 Collins-street, Melbourne).

Victoria Mark Fruit Co. Ltd., Secretary—Lewis, c/o H. E. B. Armstrong, & Co., 430 Little Collins-street, Melbourne.

Wandin District Fruitgrowers' Association, Wandin North.

Yarra Glen Fruitgrowers' Association, P.O., Steel's Creek.

VICTORIA.

Cool Stores' Associations.

The Orchardists' and Fruit Cool Stores' Association of Victoria.—Secretary, H. J. Noonan, Donvale. Affiliated stores and secretaries, as under:—

Interstate—

Batlow, N.S.W.: H. V. Smith, Batlow, N.S.W.

Bender & Co., 100 Elizabeth-street, Launceston, Tas.

Victoria—

Ardmuna Fruit Products, Mooropna.

Blackburn: A. J. Noonan, Blackburn.

Bunyip: L. Thomas, Bunyip.

Burwood East: G. C. Karnaghan, Blackburn.

Croydon: Robt. Langley, Kilsyth.
Diamond Creek: R. M. Finlay, Diamond Creek.

Doncaster East: W. Johnston, Cottage-street, Blackburn.

Doncaster West: A. T. Tully, Main-road, Doncaster.

Harcourt: H. M. McLean, Harcourt.
Hastings and District: G. H. Sprague, Hastings.

Kyabram Co-op. Fruit Preserving Co.: C. P. Crichton, Kyabram.

Mount Waverley: David Peck, Tally Ho.

Orchardists': G. S. Grover, Doncaster.

Pakenham: H. Hamilton, 271 Collins-street, Melbourne.

Portland: H. M. Williamson, Portland.

Ringwood: J. G. Aird, Ringwood.

Shepparton Fruit Preserving Co.: A. W. Fairley, Shepparton.

Somerville: T. E. Butler, 358 Collins-street, Melbourne.

Tyabb and District: Miss H. A. Foristal, Tyabb.

Wandin: F. J. Byrne, Bayswater.

Private Stores—

Box Hill Ice and Cold Storage Pty. Ltd.: C. G. Hill, Springfield-road, Blackburn.

J. Brunning & Sons, Somerville.

Elinora Orchards: A. P. Scott, Wheelers Hill.

Graceburn Valley: A. E. Hocking, 31 Queen-street, Melbourne.

R. E. Haysey, Narre Warren North.
Heatherlea: D. Lipscombe, Croydon.

A. E. Ireland, Beverley-street, Doncaster.

V. Lawford, Springfield-road, Blackburn.

W. Lipscombe, Croydon.

S. J. Perry & Co., 364 Little Collins-street, Melbourne.

Two Bays Nurseries Co., Moorooduc.

Thomas & Co. Pty. Ltd., E. H. Hatfield, Tynong.

Tacoma: F. Petty, Park-road, Mitcham.

Herb Petty: Main-road, Doncaster.

F. C. Pyke, Heatherdale-road, Ringwood.

Northern Victoria.

Northern Victoria Fruitgrowers' Association: Secretary, S. P. Cornish, Ardmuna.

Affiliated Associations.

Ardmuna: S. P. Cornish, Ardmuna.
Bamawm District: P. Glasson, Rochester.

Kyabram: G. F. Markham, Kyabram.

Lancaster: T. Hughes, Lancaster.
Merrigum: S. Youlden, Merrigum

Shepparton: N. W. Fairless, Shepparton East.

Tatura: J. G. S. Rose, Tatura.

Toolamba: J. Agnew, Mooropna.

Tongala: D. E. Barry Wood, Tongala East.

VICTORIAN CENTRAL CITRUS ASSOCIATION PTY. LTD.

422 Collins-street, Melbourne; General Manager, A. W. Schwennessen.

Branches and Secretaries.

Murrabit District Citrus Assn.: J. H. Morton, Gonn Crossing, via Kerang.

Bamawm Citrus Assn. Ltd.: W. Chapman, Lockington.

Lake Kangaroo Packing Co. Pty. Ltd.: H. S. Argyle, Mystic Park.

Mildura & Districts V.C.C.A. Executive: A. E. Cameron, Box 194, Red Cliffs.

Mildura Citrus Assn.: H. Wormwell, 15th-street, Irymple.

Merbein Citrus Growers' Assn.: R. K. Rodwell, Merbein.

Shepparton Irrigators' Assn.: N. W. Fairless, Shepparton.

Wangaratta Citrus Assn.: J. P. Larkings, Wangaratta.

Tongala Citrus Assn.: G. V. Wood, Miller-street, Tongala.

Nanneella Citrus Assn.: J. Logan, Nanneella.

Red Cliffs Citrus Assn.: G. Beith, Red Cliffs.

Long Lake Citrus Assn.: C. V. Rees, "Bloomfields," Lake Boga.
 Curlwaa Co-op. Packing Society Ltd.: L. R. Strother, Curlwaa, N.S.W.
 Cobram Fruit Packing Co. Pty. Ltd.: L. F. Edwards, Cobram.
 Cain, W. N., Madowla Park, Picola.
 Rupert J. Watson, Perriecoota, via Moama, N.S.W.
 P. Rossiter, Ngawe, Cobram.

SOUTH AUSTRALIA.

Murray Citrus Growers' Association.
 The Murray Citrus Growers' Co-op. Association (Australia) Ltd., has its headquarters at 52 Pirie Chambers, Pirie-street, Adelaide.

Central Executive, 1936:

President: Mr. A. P. Wishart (Berri).

Members: Messrs. K. Dunstan and C. B. Williams (Waikerie); C. Plush and A. V. Mills (Berri); J. Price and H. C. Carne (Renmark); J. Swanbury (Moorook and Kingston), K. F. Dowding (Mypolonga); J. J. Odgers (Ramco); R. B. Selth (Cadell), and A. R. Yeo (Barmera).

Management Committee, 1936.

Chairman: Mr. A. P. Wishart.

Members: Messrs. K. Dunstan, H. C. Carne, K. F. Dowding and C. B. Williams.

District Committees are established at Waikerie, Renmark, Berri, Mypolonga, Murray View, Moorook and Kingston, Ramco, Cadell and Barmera.

The General Secretary is Mr. N. H. Underwood.

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S.A. Fruitgrowers' and Market Gardeners' Association, W. J. Kimber, Secretary, 288A, Rundle-street, Adelaide, Box 8x.

Affiliated Association—

Barossa Fruitgrowers' Association, Secretary, Mr. A. J. Chapman, Nuri-ootpa.

WESTERN AUSTRALIA. Fruitgrowers' Association.

W.A. Fruitgrowers' Assn.: Joint Secretaries, H. W. Sutherland, c/o Producers Markets Ltd., Perth, and B. Hickling, Mt. Barker.

W.A. Fruit Organisation Committee: Sec., C. H. Merry, Commercial Union Chambers, Perth.

Affiliated Associations.

Albany: Lange, V. A.
 Bridgetown: Doust, R. E.
 Boyup Brook: Treloar, H. W.
 Central Darling Range: Holland, J. C., Kalamunda.
 Capel: Turner, T. H.
 Chitering District: O'Neill, C., Lower Chittering.
 Donnybrook & Dist.: Moore, C. R., Brookhampton.
 Denmark: Kingston, W. J.

Eastern Hills: Ilbery, T. H., Mundaring.

Harvey: Thew, J.
 Manjimup: Chatley, A. C.
 Mt. Barker: Hickling, B.
 Northern District Council: Soot-hill, H. W., Box N1041, Perth.
 South Suburban: Jackson, A. S., Kelmescott.

Spearwood Fruitgrowers' & Market Gardeners' Assn.: Mayor, A., Spearwood.

TASMANIA.

State Fruit Board: A. J. Honey, Secretary, Bursary House, Hobart. Tel. Hobart 4857.

Fruitgrowers' Associations:

Port Huon Fruitgrowers' Co-operative Association Ltd.: General Manager, J. P. Piggott, Davey-street, Hobart.

Bagdad Fruitgrowers' Co-operative Association: A. Gillow, Bagdad.
 Tamar Farmers and Fruitgrowers' Association: E. O. Lucas, Loira, West Tamar.

Tamar Valley Co-operative Company Ltd.: L. S. Taylor, Exeter.

Clarence Point Co-operative Orchard Company: Col. Oliver, Clarence Point.

Tasmanian Orchardists and Producers' Co-op. Association Ltd.: C. Cane, Murray-street, Hobart.

Derwent Valley Fruitgrowers' Co-operative Co.: H. Morgan, New Norfolk.

Spreyton Fruitgrowers' Co-operative Company: A. Heath, Spreyton.

Tasmanian Farmers' Stockowners and Orchardists' Association: A. J. Honey, Bursary House, Hobart.

Tasmanian Fruitgrowers' Protective Assn.: Thos. Burnaby, Lymington.

QUEENSLAND.

Committee of Direction of Fruit Marketing, Turbot-street, Brisbane.
 General Manager, B. Flewell-Smith;
 Sub-Manager, W. Ellison.

Affiliated registered associations, with names and addresses or secretaries, are as follows:—

Branches of the Committee of Direction:

Melbourne Office: A. V. Wilson, Box 648E, G.P.O., Melbourne.

Sydney Office: B. Cox, Box 176, Haymarket P.O., Sydney.

Rockhampton Office: S. McCullough, Box 313, P.O., Rockhampton.

Bowen Office: R. A. Kelsey, Box 171, P.O., Bowen.

Amamoor: J. F. Hulme, Amamoor.

Ambrose: A. Salmoni, Ambrose.

Aspley: W. F. King, Aspley.

Austinvile: W. J. McCurley, Austinvile, Mudgeeraba.

Bald Hills: W. E. Pearson, Bald Hills.

Brackenridge: J. F. Gaskell, Brackenridge, via Sandgate.

Brookfield: A. Mackay, Brookfield.
 Byfield: A. H. Mortensen, Byfield, via Yeppoon.

Beerburum: W. J. Soares, Beerburum.

Birkdale: F. Sturman, Birkdale.

Buderim Mt.: R. L. Miller, Buderim Mt.

Burrum District Citrus Assoc. R. G. Reaney, Howard.

Burrum L.P.A.: H. G. Bowston, Torbanlea.

Beenleigh: W. F. Benfer, Hillside, via Beenleigh.

Bowen Dist.: G. Pott, Bowen.

Bouldercombe: P. Dwyer, Bouldercombe, via Rockhampton.

Bowling Green: C. C. Neilsen, Aramara.

Baffle Creek: F. Kleinschmidt, Rose-dale, N.C.L.

Cameron Pocket: E. R. French, Cameron Pocket, Calen, N.Q.

Caboolture: A. G. Elliott, Box 13, Caboolture.

Cedar Creek: G. A. Frusher, Close-burn.

Coochin Creek: Mrs. A. L. Nielsen, Beerwah.

Cooloolabin: W. H. Sweet, Cooloolabin, via Yandina.

Cooran-Kin Kin: H. McDonald, Cooran.

Cooroy: A. Gordon, Cooroy.

Currumbin: R. Bain, Currumbin.

Dagun: P. Hicks, Dagun.

Dundowran: J. R. Stocks, Dundowran, Nikenbah.

Eight Mile Plains: E. J. Hampson, Eight Mile Plains.

Elimbah: E. Broughton, Elimbah.

Eudlo: T. Ellis, Eudlo.

Eumundi: W. B. Chapman, Eumundi.

Gympie: M. Buchanan, Goomboorian, via Gympie.

North Deep Creek and Corella: J. Colley, Tamaree.

Mary's Creek: J. P. Jackson, Mary's Creek, via Gympie.

Cedar Pocket: F. W. Johns, Cedar Pocket, via Gympie.

Chatsworth: T. P. Reynolds, Chatsworth, via Gympie.

Glastonbury: B. C. Betts, Glastonbury, via Gympie.

Goomboorian: W. Williams, Goomboorian, via Gympie.

Mooloo: W. Kirkwood, Junr., Mooloo, via Gympie.

Pie Creek: S. Adcock, Pie Creek, via Gympie.

Lower Goomboorian: G. E. Elliott, Lower Goomboorian, via Gympie.

Upper Veteran: V. B. Gray, Upper Veteran-road, Gympie.

Scrubby Creek: J. P. Carey, Scrubby Creek, via Gympie.

Gayndah and Dist.: J. G. Acworth, Box 33, Gayndah.

United Fruitgrowers Ltd.: A. Palk, Glasshouse Mts.

Howard: E. Richards, Howard.

Hunchy: G. Morrison, Hunchy, via Palmwoods.

Jubilee Pocket: J. Campbell, Jubilee Pocket, Cannon Valley, Proserpine.

Kallangur: F. W. Hansford, Kallangur, near Petrie.

Kandanga: K. L. Viles, Kandanga.

Kennedy-Meunga: J. C. Evans, Carruchan, Kennedy, N.Q.

Kiamba: P. T. Smith, Kiamba, via Yandina.

Kileoy: C. Jenkinson, Sandy Creek, Kileoy.

Lagoon Pocket: A. E. Louttit, Lagoon Pocket.

Landsborough: J. W. Goostrey, Landsborough (Conondale L.P.A.—Ward B.)

Mackay Dist.: A. Gibson, Box 120, Mackay.

Macleay Island: H. J. Broadbridge, Macleay Island, via Redland Bay.

Meeandah: P. Adsett, P.O., Eaglen Farm.

Moggill: E. Shield, Moggill.

Montville: J. M. Allen, Montville.

Mooloolah: W. J. Miller, Mooloolah. Morayfield: C. Scudamore, Morayfield.

Mt. Cotton: H. G. Holzapfel, Mt. Cotton.

Mt. Mermaid: A. R. Vaisey, Upper Brookfield.

Ratepayers' and Producers' Assoc. (Banana Section): L. J. Henman, Mudgeeraba.

Mt. Mee West: J. H. Jones, Mt. Mee West, via D'Aguilar.

Marmor: W. J. Sands, Marmor.

Nambour: R. H. Whalley, Nambour.

Flaxton: J. R. Perkins, Flaxton, via Palmwoods.

Mapleton: A. A. Probert, Mapleton. Nerang: K. R. Hack, Nerang.

North Arm: H. Mulcahy, North Arm.

Ormiston: A. Connelly, Thornlands, Cleveland.

Oxenford: A. K. G. Watt, Upper Coomera.

Palmwoods: W. Scott, Palmwoods. Pomona: H. V. Wood, Pomona.

Redland Bay: F. White, Redland Bay.

R.K.L.M. F.C.A. Ltd.: T. E. O'Doherty, Lamb Island, via Redland Bay.

Rochedale: A. G. Rumsey, Rochedale, Eight Mile Plains.

Russell Island: D. MacInnes, Russell Is., via Redland Bay.

Rollingstone: G. E. Tooth, Rollingstone, via Townsville.

Sarina: H. Jacobsen, Sarina, N.Q.

South Tamborine: E. J. Jenyns, North Tamborine.

Sunnybank: D. M. Henderson, Sunnybank.

Tanby: R. F. Strange, Tanby.

Tamborine: H. Curtis, North Tamborine.

Tinana: E. Copley, Tinana, via Maryborough.

Takura: J. H. Mungomery, Takura.

Upper Brookfield: J. Phillips, Upper Brookfield.

Upper Kedron: E. J. Pickering, Ferny Grove.

Upper Mt. Pleasant: C. MacCallum, Mt. Pleasant Settlement, via Dayboro.

Valdora: J. Leach, Valdora, via Yandina.

Victoria Point: E. Willmott, Victoria Point.

Villeneuve: E. Axelsen, Villeneuve, Kileoy L.

Wamuran & Dist.: H. S. Franks, Wamuran.

Watalgan: A. W. Sommerfeld, Watalgan N.C.L.

Waterloo: C. F. Margetts, Waterloo, via Yandaran.

West Burleigh & Dist.: S. C. Ladds, West Burleigh.

Woodford: W. C. Brooks, Woodford. Woolooga: W. P. Pedwell, Sexton.

N.C.L.

Woombye: E. E. McNall, Woombye.

Wynnum: F. J. Moore, Brisbane-road, Wynnum West.

Yarwun-Targinnie: L. M. Ferguson, Yarwun.

Yandina & Dist.: F. Peachey, Cooloolabin, via Yandina.

Yeppoon: A. E. Pascoe, Yeppoon.

(All Deciduous Associations.)

Stanthorpe L.P.A.'s.

Amiens: H. Edgar, Amiens.

Applethorpe: H. G. Ludlow, Glen Niven.

Ballandean: A. Williams, Box 16, Ballandean.

Bapaume: W. H. Bloxham, Bapaume, via Cottonvale.

Broadwater: M. Schneider, Box 93, Stanthorpe.

Cottonvale: L. C. Evans, Cottonvale.

Dalveen: A. G. White, Dalveen.

Eukey: L. G. Birch, Eukey, via Stanthorpe.

Glen Aplin: N. A. Collins, Glen Aplin.

Greenlands: J. Wylie, Spring Creek, Stanthorpe.

Mt. Tully: V. C. Sheppard, Mt. Tully, via Stanthorpe.

Pioneers: D. Ryan, Eukey, via Stanthorpe.

Pozieres: J. L. McMahon, Pozieres.

Severnlea: R. J. Bowden, Severnlea.

Stanthorpe: C. H. Lower, Box 121, Stanthorpe.

The Summit: A. D. Philp, The Summit.

Thorndale: L. Smith, Thorndale, via Stanthorpe.

Thulimbah: G. Woodbridge, Thulimbah.

Wyberba: J. R. Hickling, Bald Mt Wyberba.

USEFUL HINTS

IMPERIAL DRY MEASURE.

Avoid. of Water.		lb.	oz.
2 Glasses	1 Noggin	0	5
3 Noggins	1 Pint	1	4
2 Pints	1 Quart	2	8
4 Quarts	1 Gallon	10	0
2 Gallons	1 Peck	20	0
4 Pecks	1 Bushel	80	0
8 Bushels	1 Quarter	640	0

HAY AND STRAW WEIGHT.

36 lbs. Straw	1 Truss
56 lb. Old Hay	1 Truss
60 lb. New Hay	1 Truss
36 Trusses	1 Load

AVOIRDUPOIS WEIGHT.

For All Goods Except Gold, Silver and Jewels.	
16 Drachms	1 Ounce oz.
16 Ounces	1 Pound lb.
14 Pounds	1 Stone st.
28 Pounds	1 Quarter qr.
4 Quarters	1 Hndr'dwht. cwt.
20 Cwt.	1 Ton tn.

DAYS OF THE MONTH.

Thirty days hath September,
April, June and November,
All the rest have thirty-one,
Excepting February alone,
Which has but twenty-eight days clear
And twenty-nine in each leap year.

DRIED FRUIT PACKING SHEDS

THE following is a list of Registered Packing Sheds operating under the Dried Fruits Control Boards in the several States.

Official No. of Packing Shed; name and address of packer; situation of Packing Shed:—

New South Wales.

- 1 Leeton Packing Co., 39 York-street, Sydney. Griffith.
- 2 Leeton Packing Co., 39 York-street, Sydney. Leeton.
- 3 The Producers' Packing Co., Valentine and Quay streets, Sydney. Leeton.
- 4* Riverina Welfare Farm, Yanco.
- 5* R. H. Bow & Co., Farm No. 1534, Yenda.
- 6* W. D. Walster, Kemp-street, June.
- 7* W. Boots, Farm No. 871, Stanbridge, via Leeton.
- 8* S. V. Billings, Tapaulin, via Mildura.
- 9* Messrs. Brett Bros., c/o N. E. Brett, Mt. Dispersion, via Euston, N.S.W.
- 10 Crowe & Newcombe, 99 Curriestreet, Adelaide, S.A. Darenton.
- 11 Mildura Co-op. Fruit Co. Ltd., Curlew, N.S.W., via Mildura
- 12* White, Eley & Crimp, c/o R. A. Crimp, P.O. Box 25, Wentworth, N.S.W. Pomona.
- 13 Sharrock Bros., Goodnight, N.S.W.
- 14 W. L. Smith, Lavington, N.S.W.

Victoria.

- 16 Aden Packing Co., Irymple.
- 17 Aurora Packing Co. Pty. Ltd., 568 Collins-street, Melbourne, C.I. Irymple No. 1 Shed.
- 18 Aurora Packing Co. Pty. Ltd., 568 Collins-street, Melbourne, C.I. Irymple No. 2 Shed.
- 19 Aurora Packing Co. Pty. Ltd., 568 Collins-street, Melbourne, C.I. Merbein.
- 20 Aurora Packing Co. Pty. Ltd., 568 Collins-street, Melbourne, C.I. Redcliffe.
- 22* Chateau Mildura and Olivewood Pty. Ltd., 31 Queen-street, Melbourne, C.I. Irymple.
- 23 Irymple, Packing Pty. Ltd., Irymple.
- 24 Irymple Packing Pty. Ltd., Irymple. Merbein.
- 26 Mildura Co-op. Fruit Co. Ltd., Mildura.
- 27 Mildura Co-op. Fruit Co. Ltd., Mildura. Merbein.

- 28 Mildura Co-op. Fruit Co. Ltd., Mildura. Irymple.
- 29 Mildura Co-op. Fruit Co. Ltd., Mildura. Birdwoodton.
- 30 Redcliffs Co-op. Packing Co. Ltd., Redcliffs. Redcliffs No. 1 Shed.
- 31 Redcliffs Co-op. Packing Co. Ltd., Redcliffs. Redcliffs No. 2 Shed.
- 33 Sarnia Packing Pty. Ltd., Mildura.
- 34 Swallow & Ariell Ltd., Rouse-street, Port Melbourne, S.C.7. Mildura.
- 35 Messrs. Nieman and Derrick, Murrawee.
- 36 Nyah Fruitgrowers' Co-op. Co. Ltd., Vinifera, Nyah.
- 37 Henty Packing Pty. Ltd., Nyah West.
- 38* Hungerford & Sons, Piangil.
- 39 Allan Jenkins, Nyah.
- 40 J. & K. McAlpine, Nyah.
- 41 Nyah West Fruitgrowers' Co-op. Co., Nyah West.
- 42 Tandaco Packing Co., Nyah.
- 43 J. Thwaites, Nyah.
- 44 R. K. Woods, "Willowmere," Kyabram.
- 45 Woorinen Fruitgrowers' Co-op. Ltd., Woorinen South.
- 46* J. J. Desmond, Maccorm Packing Shed, Fairy Dell, Rochester.
- 47 C. Chequer, Quantong.
- 48 ? ? ? ? ?
- 49 C. Jamieson, Shepparton.

South Australia.

- 50* Chateau, Mildura, and Olivewood Pty. Ltd., 31 Queen-street, Melbourne, C.I. Renmark.
- 51 Cole & Woodham Ltd., Renmark.
- 52 Crowe and Newcombe, 99 Curriestreet, Adelaide, S.A. Renmark.
- 53* D. T. Durieu, Renmark.
- 54* A. Malcolm, Renmark.
- 55* J. H. M. Price, Renmark.
- 56 Renmark Fruit Growers' Co-op. Ltd., Renmark.
- 57 Seary & Wood Son & Co., Renmark.
- 58* G. R. Saies, Renmark.
- 59 F. H. Stevens, Renmark.
- 60 Barnera Co-op. Packing Co. Ltd., Barnera.
- 61 Berri Co-op. Packing Union Ltd., Berri.
- 62 Crowe & Newcombe, 99 Curriestreet, Adelaide, S.A. Barnera.
- 63 R. C. G. Frankel, Glossop.
- 64 A. G. Ireland, Cobdogla.
- 65 Monash Packing Co., Monash.
- 66 Seary & Wood Son & Co., Berri.
- 67 F. A. James, 195 Victoria-square, Adelaide. Berri.

- 68 Toora Vale Co., Berri.
- 69* H. Hunter, Ramco.
- 70* J. J. Odgers, Ramco.
- 71 Ramco Co-op. Ltd., Ramco.
- 72 Waikerie Co-op. Fruit Co. Ltd., Waikerie.
- 73 Cadell Fruit Packers Ltd., Cadell.
- 74 A. E. Hall & Co., "Hallcourt," Weymouth-street, Adelaide, Box 1029J G.P.O. Cadell.
- 75* S. J. Robertson, Murray Valley Fruit Co., Cadell.
- 76 Kingston Co-op. Fruit Packing Union Ltd., Kingston-on-Murray.
- 77* Holmes Bros., Kingston-on-Murray.
- 78* F. Merritt, Kingston-on-Murray.
- 79 Moorook Co-operators Ltd., Moorook.
- 80* Media Irrigation Pty. Ltd., Loxton.
- 81* Sherwood Packing Co., Box 62, Loxton.
- 82 Pyap Co-op. Society Ltd., Pyap.
- 83 Lyrup Village Assoc., Lyrup.
- 84 Mypolonga Co-op. Society Ltd., Mypolonga.
- 85 Angaston Fruit Growers' Co-op. Society. Ltd., Angaston.
- 86 Crowe & Newcombe, 99 Curriestreet, Adelaide, S.A. Angaston.
- 87 Exors. Estate J. W. Mattiske, deceased, Angaston.
- 88 A. Thorn, Angaston.
- 89 Stanley Dried Fruits Assoc. Ltd., Clare.
- 90 Clare Fruit Packers Ltd., Clare.
- 91 R. G. Bell, McLaren Flat.
- 92 McLaren Vale Packers Ltd., McLaren Vale.
- 93 Mrs. R. Oliver, McLaren Vale.
- 94* Miss E. M. Dowling, Langhorne Creek.
- 95 A. H. Howard, Langhorne Creek.
- 96 Crowe & Newcombe, 99 Curriestreet, Adelaide. Port Adelaide.
- 104 G. Wood, Son & Co. Ltd., North Terrace, Adelaide. Port Adelaide.

West Australia.

- 97 A. R. Boxall, Millendon.
- 98 Swan Settlers' Assoc. Ltd., Herne Hill.
- 99 St. Albans Packing Shed, Upper Swan.
- 100 A. E. Watts, Greenmount Packing Shed, Greenmount.
- 101 West Swan Dried Fruit Packing Co., West Swan.
- 102 A. Yeates, Millendon.
- 103 Cox Bros., Athgarvon, Coolup.

Note: *Private packers, i.e., packing own products only.

CATERPILLAR

REG. U.S. PAT. OFF.

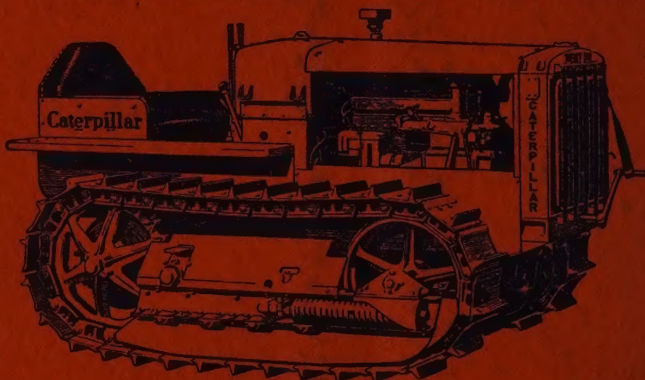
IS THE IDEAL ORCHARD TRACTOR!

BECAUSE, having no high wheels the highest point—4ft. 8in.—is at the centre of the radiator.

"CATERPILLAR" can work close under low-hanging branches with full safety to trees.

SPRAYING can be done all ways on time. Hauling a big capacity spray vat, Caterpillar powers the pump and enables spraying to be done when wet ground conditions prevent horses working.

CULTIVATION—Full width scarifiers, 3 or 4 furrow ploughs are easily pulled up hills, over soft sand, with the ample drawbar power—
Better — Quicker — Cheaper.



ILLUSTRATING MODEL TWENTY-TWO. Designed to Burn Cheap Fuels.

CHECK UP YOUR WORKING COSTS WITH—
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321 COLLINS STREET, MELBOURNE.

In the Home . . .
For Frost Protection . . .
For Incubators and Brooders . . .

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Briquettes give greatest heat because they have double heat value. They save you money because they burn longer with a richer, steadier heat. And Briquettes give greatest satisfaction because every Briquette is of uniform quality.

Do as thousands of wise housekeepers and progressive orchardists and poultrymen have done. Change over to Briquettes now! For further information write, 'phone or call on the Fuel Sales Manager, State Electricity Commission, 22 William Street, Melbourne. Cent. 4236.

